

**WHAT IMPACT WILL EMERGING TECHNOLOGIES  
INVOLVING VEHICLES AND HIGHWAYS HAVE ON THE  
MANAGEMENT OF TRAFFIC LAW ENFORCEMENT BY THE  
YEAR 2002?**

**TECHNICAL REPORT  
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**ABSTRACT**

The study explores the future potential impact that emerging transportation technologies and mass transit will have on the management of traffic law enforcement . The study consists of three sections: a futures study of the impact of technology on law enforcement; a strategic plan using the California Highway Patrol as a model, but with specific application to any size law enforcement agency with traffic management responsibilities; and a transition management plan. A panel of law enforcement and transportation experts, as well as research, support the premise that despite technological advancements traffic congestion will continue to increase in metropolitan cities requiring greater law enforcement response. Emphasis is placed on a contrasting point of view by assuming that the technologies will have sweeping impact on law enforcement and significantly reduce the need for service. Conclusion, recommendations and further research are incorporated in a separate stand alone narrative. Appendixes include references and bibliography.

**This Command College Independent Study Project is a FUTURES study of a particular emerging issue in law enforcement. Its purpose is NOT to predict the future, but rather to project a number of possible scenarios for strategic planning consideration.**

**Defining the future differs from analyzing the past because the future has not yet happened. In this project, useful alternatives have been formulated systematically so that the planner can respond to a range of possible future environments.**

**Managing the future means influencing the future--creating it, constraining it, adapting to it. A futures study points the way.**

**The views and conclusions expressed in the Command College project are those of the author and are not necessarily those of the Commission on Peace Officer Standards and Training (POST).**

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## INTRODUCTION

What impact will emerging transportation technologies and strategies involving vehicles and highways have on law enforcement by the year 2002? Because it is difficult to keep pace with emerging technologies and a constantly changing world, this is not a question easily answered. Using various research techniques, this study will attempt to forecast the impact that new transportation technologies will have on the management of traffic by law enforcement agencies in the future. Two very extreme possibilities exist.

The first possibility, as described in Vision 2010, a special report prepared by the California Economic Development Corporation at the request of the Governor, provides the following information:<sup>1</sup> Motorists in California waste more than 300,000 hours a day in traffic. Using minimum wage as the standard, this translates into \$1,800,000 a day. Traffic over the past twenty year's has grown five times faster than the capacity of the highway system. The result is poorer service, increased travel time, and higher out of pocket expenses that reduce productivity and deter businesses from locating or expanding in California.

The average commute time in California is now approximately 45 minutes. Forecasters predict that by the year 2010 this figure could rise to two hours. It is also expected that freeway congestion will increase fivefold. By 2010 the average speed during commute will be reduced from 35 mph to 19 mph.<sup>2</sup>

By 2010 futurists indicate that there will be 1/3 more Californians than today — some 36 million. There will be 41% more drivers demanding 50,000 more miles of roadways. As a result, congestion will increase a minimum of 15% over the next ten years.<sup>3</sup>

The assumptions in this forecast are that there will be few if any new technologies that will have a significant impact on the management of traffic in the future. However, it is believed that with the end of the cold war, focus will be redirected away from military applications to developing technologies that will redefine

travel as it is known today. This in turn will affect the way law enforcement will manage traffic responsibilities.

Traffic congestion and its impact on daily life have emerged as perhaps one of the most significant issues of this decade. If technological development switches from the defense mode to transportation issues as expected, the first forecast may not occur. Therefore the second possibility suggests a contrasting viewpoint by assuming that numerous transportation technologies have been developed, that they have been implemented, and that they work as designed.

Before discussing the second possibility it is imperative to highlight a few of the technologies currently being explored. In the forefront is a smart highway system with smart cars known as Intelligent Vehicle Highway Systems (IVHS).<sup>4</sup> IVHS systems are electronic, computer and communications technologies that provide drivers with everything from map-based travel information to collision avoidance systems. ***Their purpose is to improve highway safety and alleviate traffic congestion.*** Coupled with law enforcement assisted traffic management centers, motorists and road conditions are tracked. Advanced traveler information systems can then relay real-time traffic conditions between a central control station, the road, and vehicles and drivers.

Another component of the IVHS system is an electronic map that provides drivers with navigational information. These navigational systems were developed to reduce driving time by using data from global positioning satellites, sensors implanted in roadways, reports from law enforcement agencies and video cameras to alert motorists of road construction, congestion and traffic accidents. The in-dash navigational systems provide motorists with visual as well as audio directions to any address. The system will plot a course to the destination showing the driver where to turn and warning of any upcoming traffic problems along the route. Unless one ignores the information it is virtually impossible to get lost.



Perhaps the most sophisticated portion of IVHS is the advanced vehicle control systems. These are technologies designed to alert the driver of potential hazards, such as impending collisions, or to take preventive action, such as applying the brakes. Eventually computer driven smart cars will allow the operator to put the vehicle on automatic pilot while they nap, read a book or stretch out in the back seat during a long trip.<sup>5</sup> This system, currently in development, relies on a camera as the vehicle's eyes and a computer as the brain. It has been proven successful at keeping vehicles within lanes at speeds of up to 65 mph. Tests have also been successful with a driverless vehicle closely following another at speeds of 30 mph. ***Such a system, if fully implemented, will allow more vehicles to move faster on highways without the danger of colliding.*** This will significantly benefit law enforcement agencies with traffic management responsibilities.

Taking smart cars a step further, consider the development of an extrasensory car.<sup>6</sup> Pilots fly safely in pea soup conditions using sensory-enhancing systems. Someday, drivers will navigate the roads using similar devices. Under development are cars that use an array of high-tech sensing control, and navigation devices that have the potential to greatly expand the senses and reflexes of the average driver. They operate much the same way as aircraft instrumentation, landing and navigation systems which enhance the reflexes and senses of pilots and allow takeoffs and landing under formerly unthinkable conditions. Applications to vehicles will be in the form of night vision systems, radar braking, laser ranging, rearview blind spot detection, and other sensory enhancing systems, ***all designed to make travel safer and more efficient.***

Public transit is another source for emerging transportation technologies. High speed commuter trains are rapidly being implemented in major metropolitan cities. In Southern California, commuter trains now connect three counties, Los Angeles, San Bernardino and Orange. Others are soon to follow. In Washington, D.C., Amtrak introduced it's new techno-train, the revolutionary X2000.<sup>7</sup> The train can attain speeds of up to 155 mph, significantly reducing commute time between points of operation. Magnetic

levitation trains that are currently operating successfully in Japan are now being considered for use in the United States.

Other strategies being considered to enhance the safety and free flow of traffic include high occupancy vehicle lanes, real time traffic control and monitoring devices, toll roads, automated and powered roadway systems, and neural network detection of congestion in integrated freeway and arterial traffic networks. Wide scale implementation of these strategies and technologies are expected to significantly reduce the unbearable traffic congestion that currently exists in most major metropolitan cities in the United States.

The second possibility suggests that in spite of projected increases in population, as well as the number of drivers, technology will significantly reduce traffic. Here the assumptions are made that the technologies will gain the widespread acceptance of the public, that they will be implemented, and that they will work as designed. Going one step further, one must ask, "How will the implementation of transportation technologies impact law enforcement?"

In addressing this question it is a well known fact that most major law enforcement agencies commit significant resources to manage and regulate traffic within their jurisdictions. In comparison to their total budget, even the smallest agency will spend considerable time and money dealing with traffic. In an era of declining resources, every penny counts. With the implementation of emerging transportation technologies and strategies, it is expected that law enforcement will be able to redirect a significant portion of monies now spent for traffic related responsibilities to other priorities. This will be made possible because it is anticipated that technology will significantly reduce traffic congestion and accidents that result in injury or death. If this occurs, incidents that now require the presence of a law enforcement officer will be significantly reduced or totally eliminated. A significant reduction in traffic responsibilities will then allow law enforcement agencies to redirect resources designated for traffic management to other areas of responsibility or need.

Traffic no longer being a priority, full service law enforcement agencies will be presented with numerous opportunities to channel money and personnel to programs that reduce rising incidences of crime. Even the smallest agencies will experience some positive results. An agency that is task specific, such as the California Highway Patrol, may have to expand its sphere of responsibility, merge with another law enforcement agency, or even cease to exist.

While both of the possibilities presented may be somewhat extreme, a combination of the two may be more realistic, especially when considering the availability of funding to develop and implement technology as well as the special interest groups and politics that may have an impact on implementation. This research will attempt to analyze the many variables and forecast the most likely scenario which identifies how emerging transportation technologies involving vehicles and highways will impact law enforcement in the future.

### **IDENTIFICATION OF ISSUE AND SUB-ISSUES**

The need to research this issue and its impact on law enforcement became evident as transportation technologies and strategies began to emerge as a viable means to reduce traffic congestion. With difficult economic times projected to continue for the next several years, law enforcement agencies must be cognizant of any opportunity that may enhance organizational efficiency. Widespread implementation of transportation technologies by the turn of the century will have significant impact on law enforcement operations and present many new opportunities. Whether or not this impact is positive or negative will be dependent on an agencies ability to monitor and forecast transportation related trends and events.

The issues and sub-issues generating this research were further developed after monitoring various related trends and events throughout 1992 and 1993 from different media and professional journals — daily newspapers, news magazines, and

related studies. The issue identified for study in this research project is:

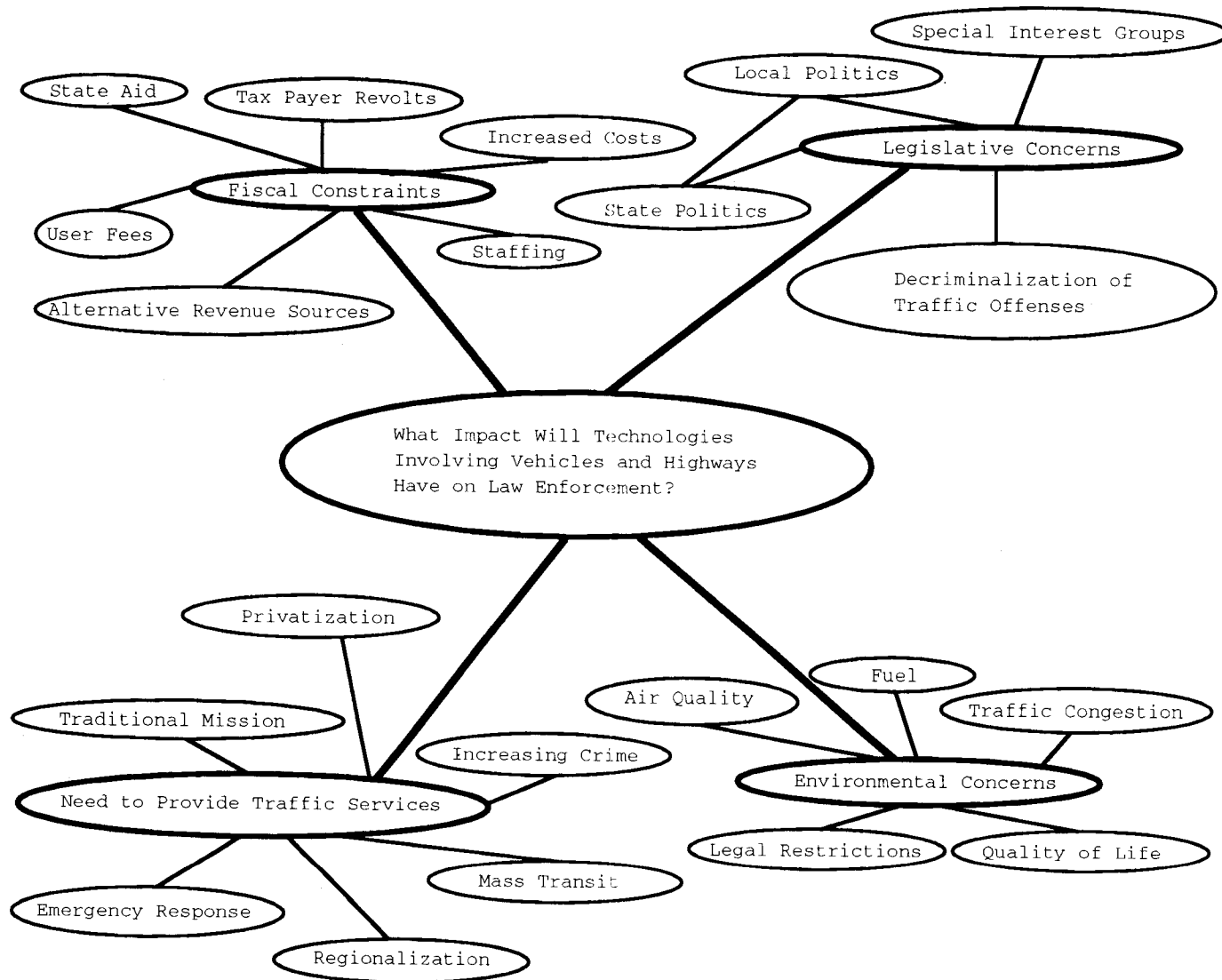
***WHAT IMPACT WILL EMERGING TECHNOLOGIES INVOLVING VEHICLES AND HIGHWAYS HAVE ON LAW ENFORCEMENT BY THE YEAR 2002?***

Discussion with colleagues, consultants of the Commission on Peace Officer Standards and Training (POST), and transportation experts helped to identify and expand the following sub-issues in order to further refine the study process and to more clearly define the parameters of research:

- 1. What methods will law enforcement use to determine and pay for the cost of implementing change as a result of emerging transportation technologies?***
- 2. What impact will technology have on the need to provide traffic services?***
- 3. What legislative changes would be required to implement the technological changes?***

To further clarify the study and focus the issue, a "Futures Wheel" was developed (Table-1). A futures wheel aids in the recognition of impacts and relationships of issues. Placing the critical issue of technology in the center of the wheel, one can visualize and place relevant second and third level issues in a relational framework. It also provides a perspective on the impact of the specific issues under consideration.

**Table 1**



The issues and sub-issues were recognized by this researcher for their potential influence on the implementation of transportation technologies and their impact on law enforcement. This was completed through independent research in the form of literature review as well as input from traffic experts from the California Department of Transportation, California Highway Patrol Traffic Management Center, City of Los Angeles Public Works Department, and the Los Angeles Metropolitan Transit Authority.

It is believed that an examination of this issue will significantly impact the manner in which law enforcement agencies commit resources to the management of traffic. If the technology works as designed and is implemented on a wide scale, then traffic congestion should be greatly reduced. Personnel who have been routinely assigned to traffic related responsibilities will be available for other assignments. Instead of hiring additional personnel or cutting budgets, agencies will be able to redirect their resources to better address the problems at hand. The number of people available for reassignment is dependent upon the size of the agency. Perhaps the greatest impact will be felt by task specific agencies dealing solely with traffic law enforcement — highway patrol, state police etc. The implementation of transportation technologies will also provide numerous opportunities for some law enforcement agencies to expand. Especially in the field of mass transit.

#### **IDENTIFICATION OF TRENDS AND EVENTS IMPACTING THE ISSUE**

After the issues and sub-issues had been defined, a twelve member panel of individuals with various backgrounds related to the issue was convened. Members of the panel included:

R. A. Parris, Attorney at Law, Communications Expert, Private Sector.

Lynne Diebold, Transportation Planner, CHP.

Greg Augusta, Newhall Area Commander, CHP.

Shawn Watts, Transportation Planner, CHP.

Pete Mader, Baldwin Park Area Commander, CHP.

R. N. Noonan, Assistant Chief, Southern Division, CHP.

W. Pasley, Communications Expert, Traffic Operations Center, CHP.

W. Baker, Riverside Area Executive Officer, CHP.

D. Hahn, Redding Area Field Operations Officer, CHP.

Goro Endo, Senior Transportation Engineer, Cal-Trans.

Michael Wendtland, Senior Traffic Engineer, LA DOT.

Anson Nordby, Senior Transportation Engineer, Cal-Trans.

Following a discussion of the issues and sub-issues, a ***Nominal Group Technique*** (NGT) was used to identify trends and events relative to the issue of what impact will emerging transportation technologies have on law enforcement by the year 2002. NGT is a small group technique for achieving agreement on the answer to a single, usually complex, question by a process that alternates individual work and open discussion. NGT includes the individual generation of ideas in writing, a round-robin recording of ideas, a serial discussion to clarify ideas, a preliminary vote on items, discussion, and a final vote on selected items.

A brief background on the issue to be discussed was presented and the group was asked to independently identify what they felt were the most likely events and trends that might affect emerging transportation technologies involving vehicles and highways and their impact on law enforcement agencies by the year 2002.

## EVENT IDENTIFICATION

The NGT panel first identified twenty-nine related events (Appendix A). The NGT panel arrived at this list of twenty-nine events after being instructed to project possibilities for the future, and to imagine things that might happen and have an impact on the study issue. After a brainstorming effort to list panel ideas, a discussion took place to ensure that each event listed was framed within the context of being a single time occurrence.

The panel then voted to identify the ten most critical or important events. Each panel member voted privately as an individual. The results were then collated for a group response. The top ten events selected are:

### **Events**

#### **E-1. State traffic management agency created.**

Regional traffic management agencies currently exist. There will be a movement to combine these agencies and create a statewide agency that standardizes and regulates traffic on all roadway networks within the state.

#### **E-2. New transportation technologies require greater law enforcement response.**

As new transportation technologies emerge they will initially require greater law enforcement resources to implement. Once the systems are on line a reduction in the need for personnel is expected to occur.

#### **E-3. Funding is unavailable to implement technology.**

Technology has been developed, but there are no funds to support the widespread implementation. Public entities will be burdened with the majority of costs associated with implementation. The public is not willing to pay more in terms of taxes to implement these technologies.



**E-4. Gridlock as a result of a recovering economy.**

The State's economic slump has severely restricted the ability of many Californians to take planned vacations. Hard times have also encouraged car pooling and other means of transportation. As economic conditions improve traffic will increase to the point where potential gridlock may occur. Another factor in this event includes projections for increasing population resulting in a greater number of vehicles using the State's transportation networks. The panel predicted that this would be a single event for motorists during economic recovery but also realized the potential of this event as a continuing trend.

**E-5. Traffic management becomes an environmental issue leading to a court mandate for law enforcement action.**

Congestion has become intolerable and conservationists will increase their attempts to lobby the legislature to pass laws regulating the use of the personal vehicle as the primary means of transportation. Specific ridership could be restricted during commute hours as an air quality issue. It will be law enforcement's responsibility to enforce these laws.

**E-6. Catastrophic collapse of roadway networks requires increased law enforcement response.**

California is due for a major catastrophic event. The State's nuclear power plants are aging and the possibility of a significant event impacting roadway networks exists. This event may be triggered by a major earthquake. The State's transportation networks are also deteriorating and an earthquake of significant magnitude could cause a number of structures to collapse. Any collapse of highway structures within metropolitan area has the potential to create extreme traffic congestion lasting several years due to reconstruction.

**E-7. Completion of digital cellular technology.**

This technology will allow instant tracking and communication with persons and vehicles. Widespread use will greatly enhance the capabilities of traffic management centers to provide real time information to the motoring public.

**E-8. AQMD mandates minimum four passengers per vehicle ratio during commute hours.**

To relieve congestion it will become necessary to mandate the number of occupants in private vehicles to at least four. It would be law enforcement's role to enforce compliance with these mandates.

**E-9. Failure of information infrastructure.**

The public has become more dependent on information networks to guide daily travel. Failure of these systems will significantly require greater law enforcement involvement. Long term failure will create additional congestion. IVHS systems because of failure could initiate some catastrophic events.

**E-10. Magnetic levitation trains redefine long distance travel in the United States.**

Magnetic levitation trains, although they exist in other countries, have not been introduced into the United States. As rapid transit evolves, these trains will be instrumental in linking major metropolitan cities within California.

Each panel member made their individual forecast on an event evaluation form as shown in Table 2. This researcher then ranked the forecasts of the twelve member panel in numerical order and determined the median forecast.

Table 2

### EVENT FORECAST (Nominal Data)

EVENT	Years until probability first exceeds zero	Probability (0-100)		Impact on the issue if the event occurred (0-10)	
		+5 years 1997	+10 years 2002	Positive	Negative
1. Statewide traffic management agency created.	4	50	80	10	
2. Transportation technologies require greater law enforcement response.	2	80	95		5
3. Funding is unavailable to implement technology.	0	73	80		10
4. Gridlock as a result of a recovering economy.	3	60	83		8
5. Traffic management becomes an environmental issue leading to court mandate for law enforcement action.	1	78	90		6
6. Catastrophic collapse of roadway network requires law enforcement response.	4	60	80		10
7. Completion of digital cellular technologies (PCD's).	4	80	97	7	
8. AQMD mandates minimum 4 passenger per vehicle ratio during commute hours.	4	50	75	90	
9. Failure of information infrastructure.	4	20	20		10
10. Magnetic Levitation train redefines long distance travel in the United States.	9	0	40	10	

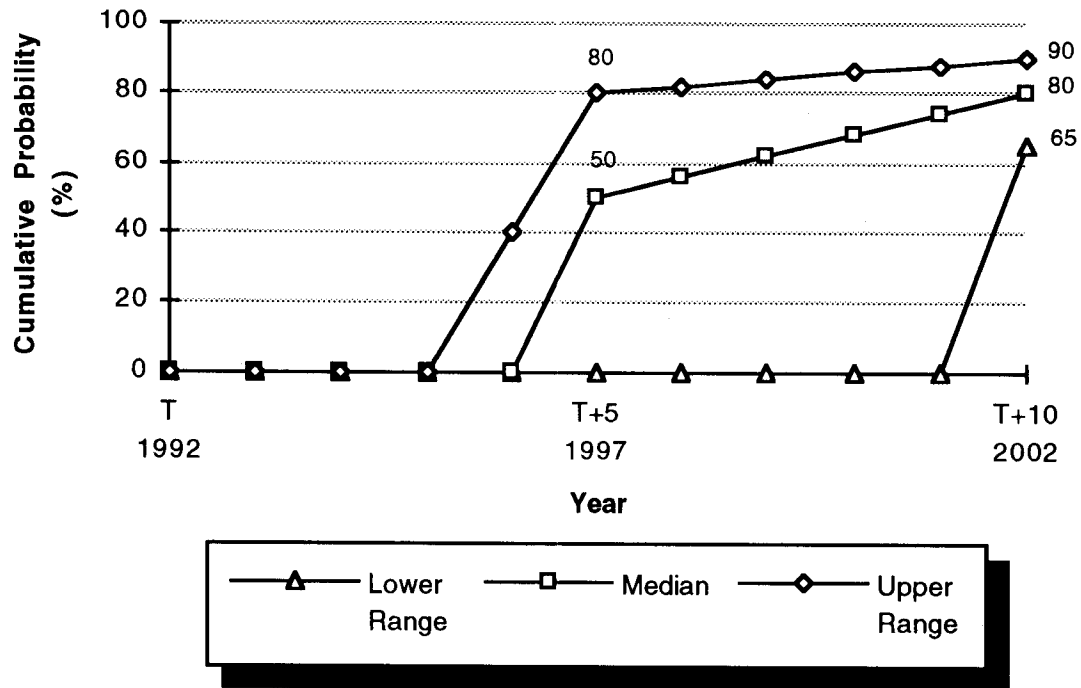
N=12

The forecast for each event included the number of years until probability first exceeds 0%, the percentage probability of occurrence, both five years from now and ten years from now, and the positive and/or negative impact on the issue should the event occur, using a zero to ten scale. The following graphs represent the event forecast. The use of the upper and lower mean deviations from the median softens the possibility of a small group of individuals from skewing the data. This was used on all graphs even though there may have been a close consensus on the issue.

Table 3

## Event 1

### Statewide Traffic Management Agency Created

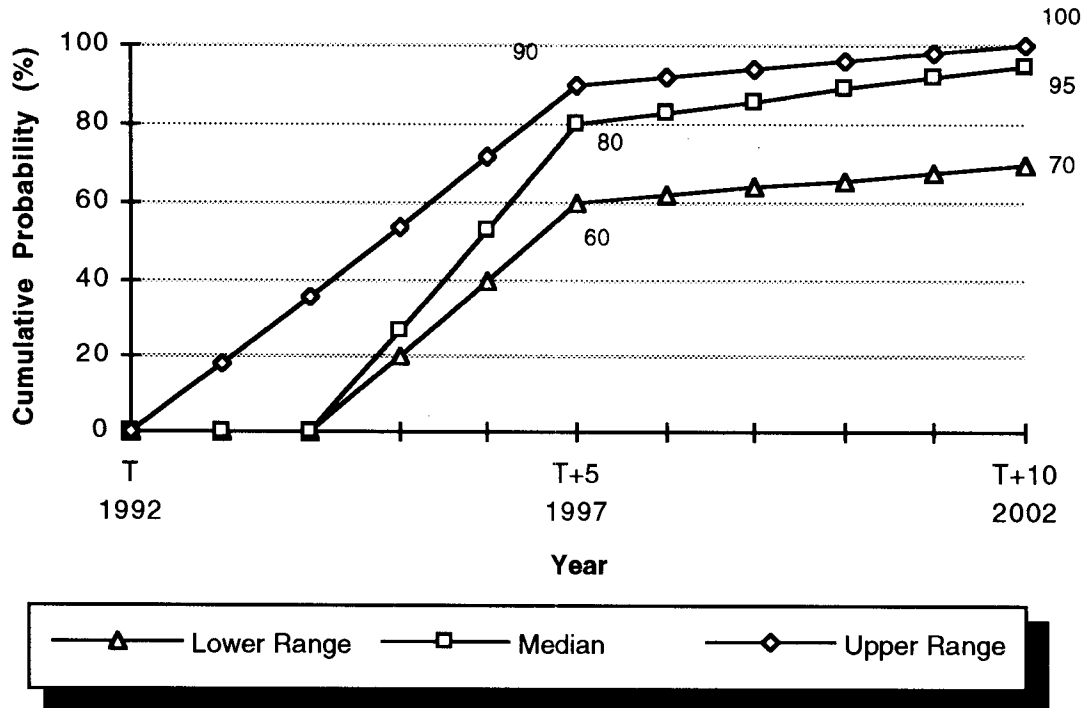


The first possibility of the formation of a regional traffic management agency as perceived by the panel could occur in three years. From this point, the possibility increases steadily, to 80% in five years and 90% in ten years. This will be a regulatory agency with significant input into the implementation of traffic management systems. The agency will provide specific direction to cities and counties on how to manage congestion.

Table 4

## Event 2

### Traffic Management Systems Require Greater Law Enforcement Response

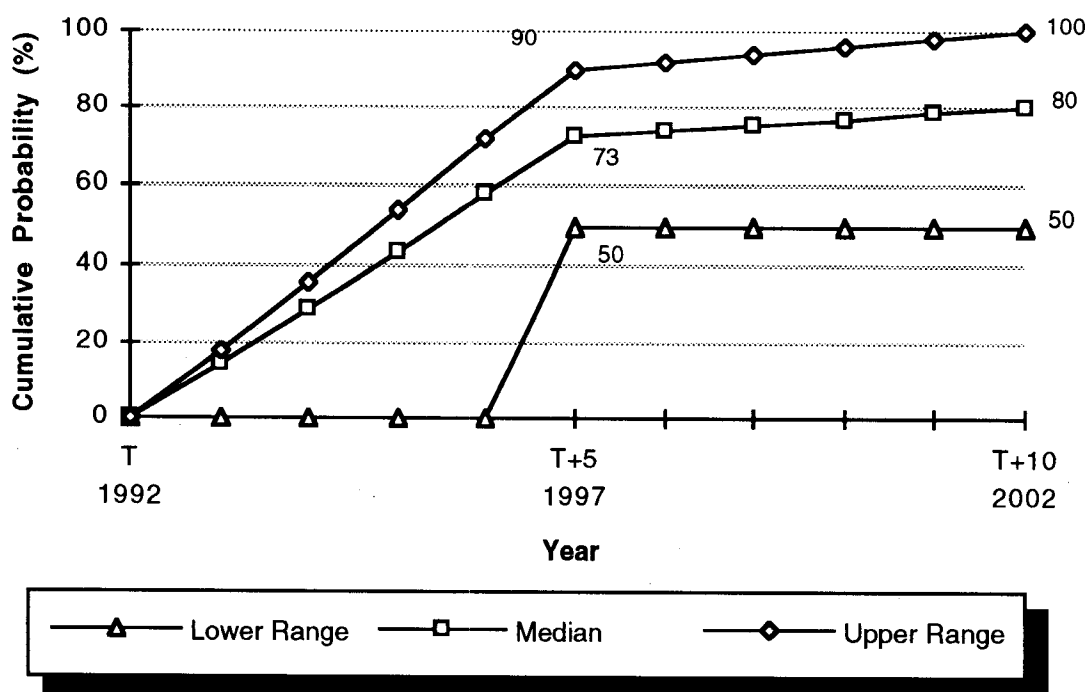


Even though new technologies are designed to reduce congestion and/or incidents, the panel felt that new traffic management systems would require greater law enforcement response. As illustrated by the graph, the probability of greater law enforcement response begins as early as the second year and steadily increases each year thereafter. There is an 80% probability of an increased need for law enforcement response in year five with a 95% probability of the need for additional law enforcement response by the tenth year.

Table 5

### Event 3

## Funding Is Unavailable to Implement Technology

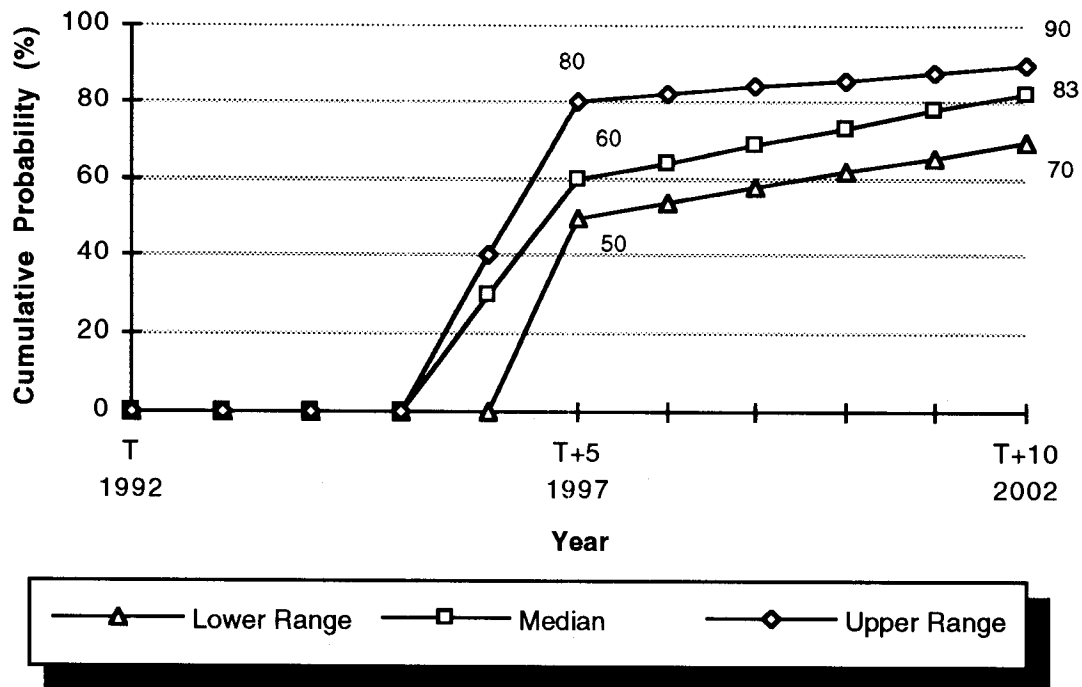


The development and implementation of technology is expensive. The panel forecast that funding to implement new traffic management systems would be scarce if not totally unavailable — 73% probability in five years and 80% in ten years. The panel's optimistic scenario (i.e., lower range in this case) gives only a 50/50 chance for available funds in ten years. Extrapolating the event using standard linear regression for the median provides an estimate of the date when funds will no longer be available. Based on this methodology and given no changes in current public funding sources, new technologies will go unfunded within 25 years. This reflects the importance to develop alternative sources as soon as possible.

Table 6

## Event 4

### Gridlock as a result of a Recovering Economy

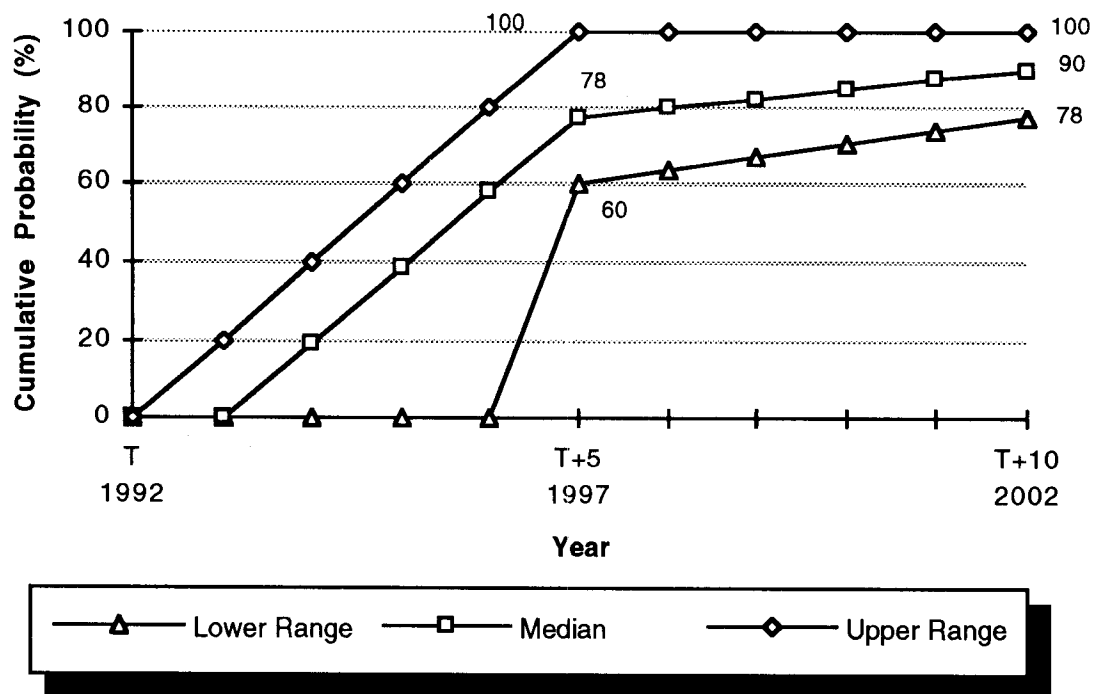


The current economic picture for California is extremely bleak. However, the panel was optimistic that the economy will recover. As it does, congestion will also rise as more people take to the road. Generally, the panel saw a sharp rise in traffic congestion, especially over the next five years. The probability of increased traffic congestion begins in year three and rapidly increases to 60% by year five. In year ten the probability becomes 83% that congestion will increase due to a recovering economy.

Table 7

## Event 5

### Traffic Management Becomes an Environmental Issue



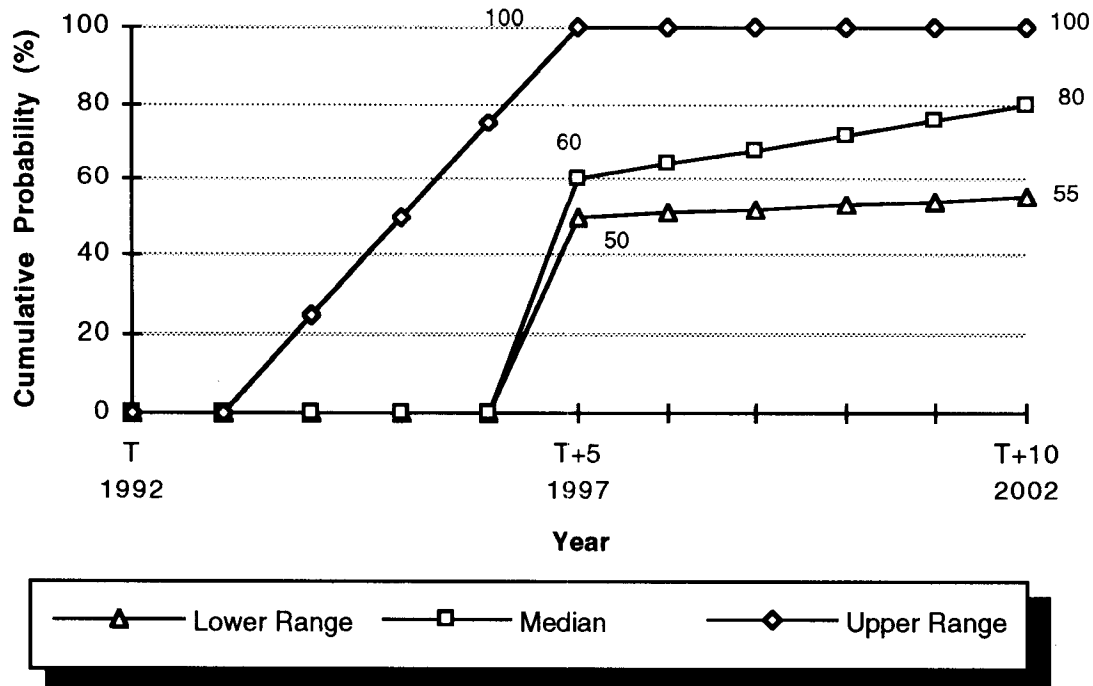
Currently the management of traffic involves a number of different aspects that encompass environmental, social, and law enforcement issues. The panel forecast that traffic management will evolve solely to an environmental issue. The probability that this will occur begins by the end of the first year and increases rapidly thereafter. The probability is 78% in five years and 90% at the end of the tenth year.



Table 8

## Event 6

### Catastrophic Collapse of Roadway Network Requires Law Enforcement Response

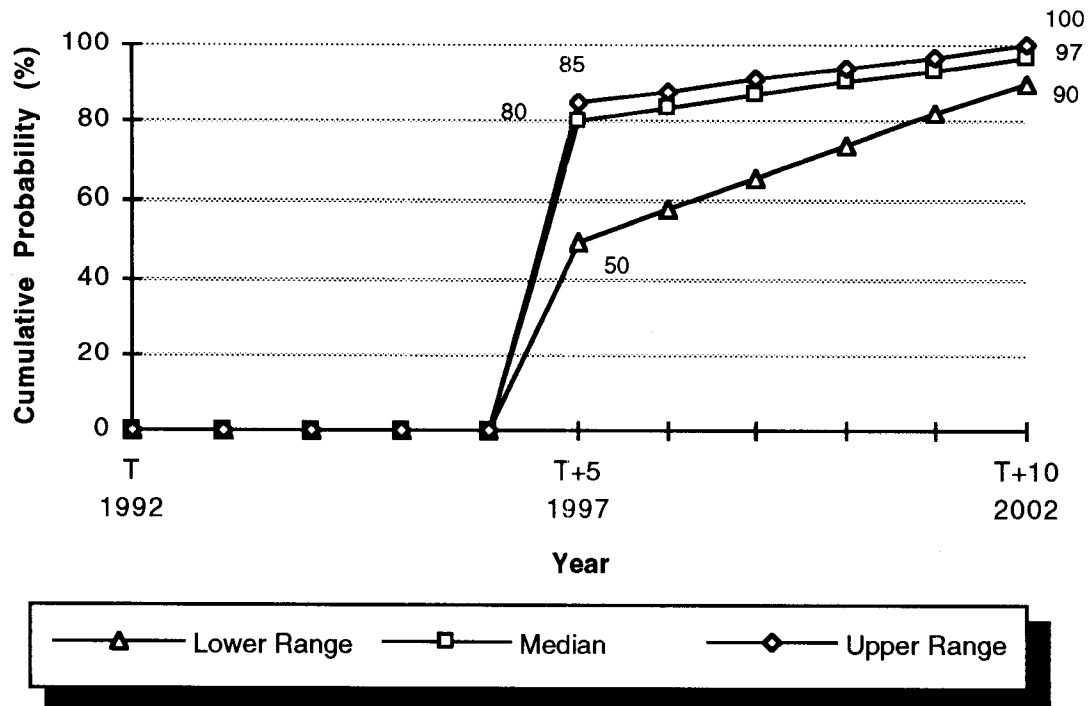


Through the years, public and private entities have worked hard to build, maintain, and improve transportation networks. In spite of those improvements, the threat of a major catastrophe is apparent. A significant earthquake, nuclear disaster, or collapse from old age may affect the highway system at any given moment. The panel felt that the probability of one of those events occurring would begin in the fourth year. Five years from now the probability would be 60%. By the tenth year the probability of a major event affecting the transportation infrastructure increased the 80%.

Table 9

## Event 7

### Completion of Digital Cellular Technology (PCDs)

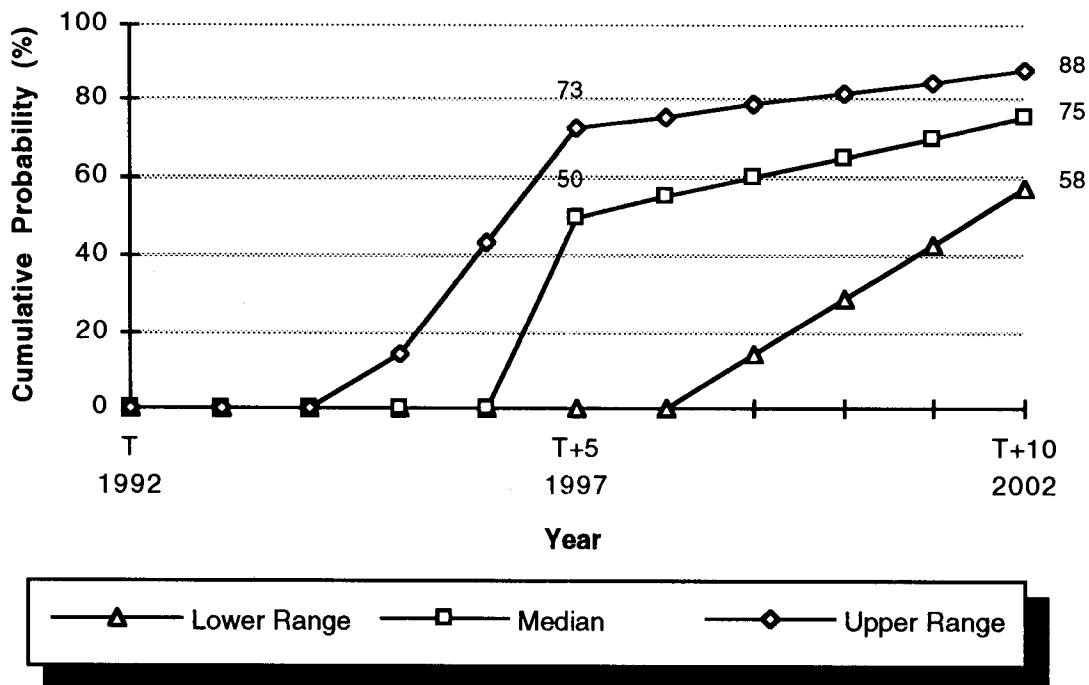


Digital cellular technology will allow tracking and instant communication with all persons and vehicles. With the availability of this technology, communication requirements for transportation information and services will increase. The panel felt that although this technology is at least four years from implementation, it is almost a certainty (97%) that it would exist at the end of ten years.

Table 10

## Event 8

### AQMD Mandates Minimum Passenger per Vehicle Ratio During Commute Hours

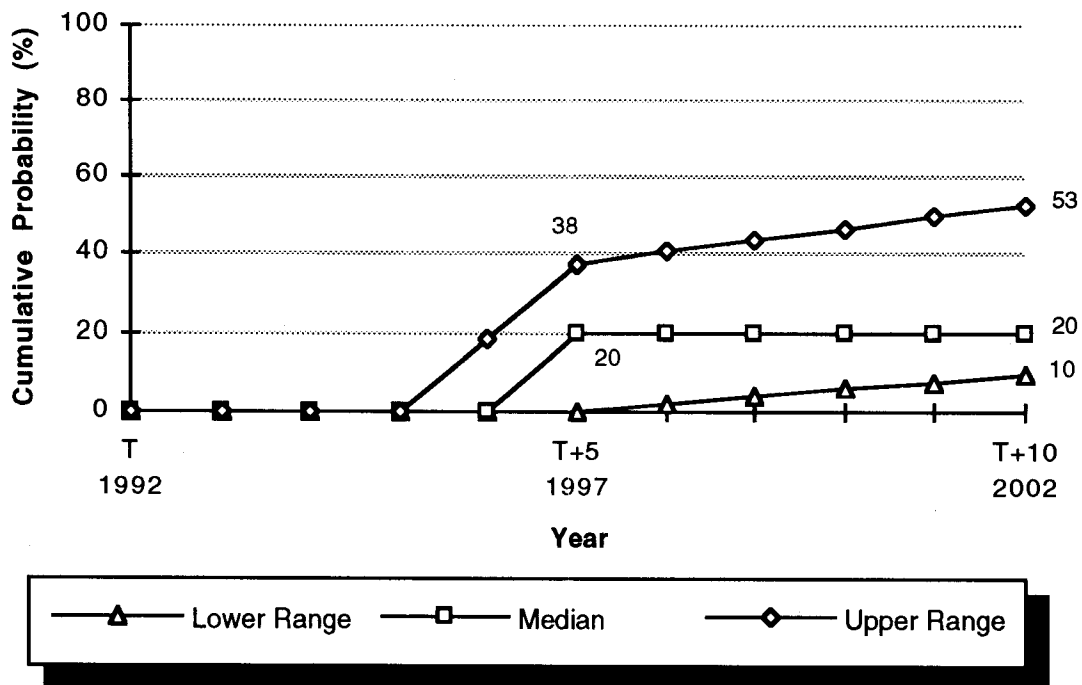


The use of the personal vehicle is the primary mode of transportation for Californians and will remain so in the future. Evidenced by the fact that the majority of vehicles during commute only have one occupant, transportation experts have long been seeking ways to increase vehicle occupancy through preferential high occupancy vehicle lanes and other monetary incentives. To date they have been unsuccessful at accomplishing their goals. As forecast by the panel, the Air Quality Management District (AQMD) will legislatively mandate minimum passenger per vehicle ratios during commute hours to reduce congestion. However, as the chart indicates there was a relatively large difference between the upper and lower ranges, indicating differing opinions as to if and when the AQMD would be able to accomplish such a mandate. Again using the median data, the probability that this may occur begins in year four, increases to 50% in year five and is 75% in year ten.

Table 11

## Event 9

### Failure of Information Infrastructure

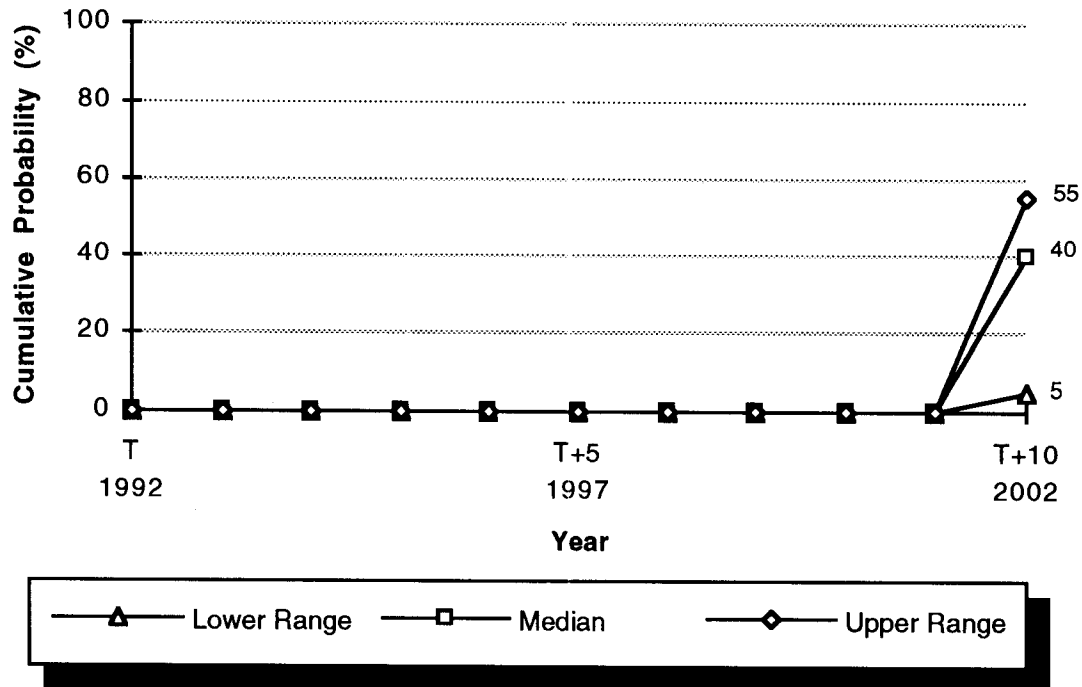


Information technologies have been increasing steadily for the last decade and are expected to accelerate even faster as the world approaches the 21st century. Travelers have become increasingly reliant on information infrastructures. A catastrophic collapse of the information system would have a profound negative effect on everyday life. In forecasting this event, the panel indicated that the probability of this event occurring is unlikely; only 20% by year five and then not increasing thereafter.

Table 12

## Event 10

### Magnetic Levitation Trains Redefine Long Distance Travel In The United States



Magnetic levitation trains are but one mode of transportation being planned for the future. Once on line, this technology will redefine travel as it is known today for distances in excess of 200 miles. The first probability that this technology will exist in the United States is at least nine years away with the probability increasing to 40% by year ten.

## TREND IDENTIFICATION

The forecasting panel then identified a list of 29 related trends (Appendix C). The panel voted privately and individually in a process to prioritize and narrow the trends to the ten most important, in light of their value for study with relation to the issue. The top ten trends selected are:

### Trends

#### **T-1. Fiscal Environment.**

Adequate funding will be unavailable to fully implement transportation technologies and mass transit systems. As a result traffic congestion will increase and require greater law enforcement response.

#### **T-2. Alternate modes of transportation.**

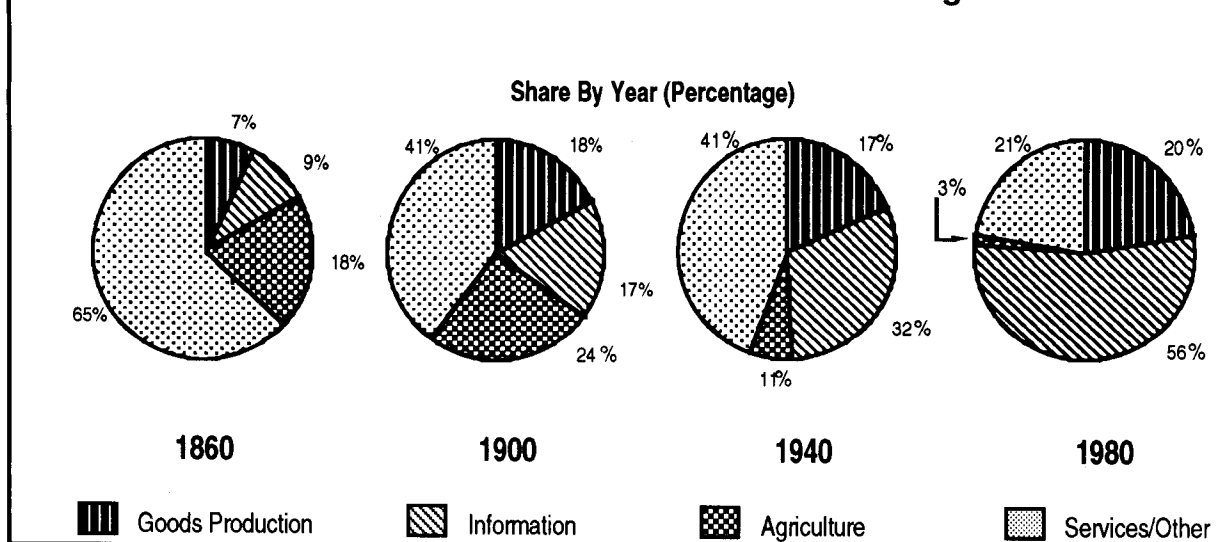
To relieve traffic congestion alternate means of transportation will need to be explored. Mass transit systems that are efficient, convenient and cost effective may have the greatest impact on reducing traffic congestion.

#### **T-3. Demand for traffic information.**

The public has come to rely on information networks to provide information that will assist them in planning the most expedient route to their destination. The demand for these services will require a greater input and coordination by law enforcement. Table 13 below illustrates the growth of information in California in relationship to goods production, agriculture and other services from 1860 to 1980. In the 90's, traffic information has become a necessity of life.

Table 13

### California Has Entered The Information Age



#### **T-4. Amount of use of mass transit for commuting.**

Although there is an increased focus on the use of mass transit the public is unwilling to give up the convenience of driving their own personal car. Mass transit systems are not being used to their fullest potential. This is due partly to cost and perception of personal safety. Government may have to intervene and make this mode of travel more appealing.

#### **T-5. Efficient use of government resources funds transportation technologies.**

Government wastes billions of dollars nation wide. Streamlining bureaucracy and the effectiveness of government will provide additional revenues that can be directed to fund transportation programs.

#### **T-6. Privatization of transportation management.**

A viable alternative means of implementing transportation technologies efficiently is to solicit the private sector to invest funds, build and manage transportation systems.

#### **T-7. Level of traffic related violence.**

Congestion on the State's transportation networks will affect the level of traffic related violence. If transportation technologies are implemented and work as designed, the level

of traffic related violence should decline. Unfortunately, if the forecast is correct congestion will get worse resulting in increased traffic related violence.

**T-8. Influence of special interest groups/politics in implementing transportation technologies.**

Special interest groups will impact the implementation of transportation technologies, funding, and government's effort to become more efficient. Some technologies will be implemented very quickly, while those that are more controversial will be delayed. Law enforcement's ability to effectively manage transportation will be severely hampered.

**T-9. Level of alternate funding sources.**

In order to implement transportation technologies or fund additional law enforcement personnel to manage traffic, additional funding sources need to be identified.

Unfortunately, the level of alternate funding sources are declining and will continue to do so. The public is not responsive to increasing taxes in order to pay for the huge costs of developing mass transit systems and other transportation technologies.

**T-10. Amount of change in attitudes and abilities of drivers.**

As the nation's population grows older the abilities of drivers will decline creating additional demands on law enforcement. Congestion will also take its toll. The lack of efficient and cost-effective mass transit will foster the attitude that the personal vehicle is the preferred choice for transportation regardless of the consequences.

Forecasting each of the identified ten most important trends, T-1 through T-10, was accomplished by use of a trend evaluation form (Table 14). The NGT panel first estimated the level of the trend five years ago, then forecast the level of the trends five and ten years from today. All trend forecasts were based on the current status of the trend being assigned a value of one hundred, to give a common



frame of reference. The lower limit of the scale is zero, representative of when the trend ceases to exist, or has yet to begin. The upper end of the scale has no limit. The panel was asked to provide an "exploratory" (will be) and "normative" (should be) forecast. Each panel member made their individual forecast on a trend evaluation form. This researcher then ranked the forecasts of the twelve panel members and determined the median forecast. Table 14 below reflects the results of the median forecast.

Table 14

### TREND EVALUATION

TREND STATEMENT	Level of the Trend (today = 100)			
	* 5 Years ago	* Today	* 5 Years Nominal "Will Be"	*10 Years Nominal "Will Be"
1. Fiscal environment.	90	100	100	113
2. Alternate modes of transportation.	103	100	100	100
3. Demand for traffic information.	73	100	125	63
4. Amount of use of mass transit for commuting.	53	100	125	63
5. Efficient use of government resources funds transportation technologies.	78	100	125	163
6. Privatization of transportation management.	40	100	128	175
7. Level of traffic related violence.	70	100	123	170
8. Influence of special interest groups/politics implementing transportation technologies.	80	100	150	180
9. Level of alternate funding sources.	75	100	133	160
10. Amount of change in attitudes and abilities of drivers.	78	100	110	123

\* Panel Medians

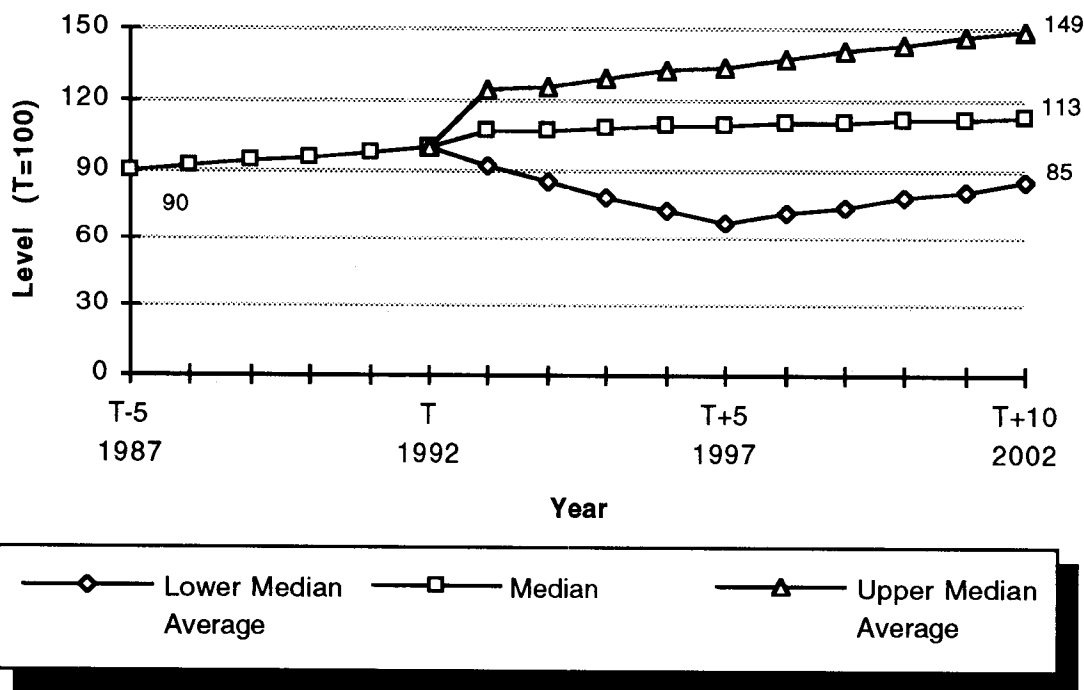
N=12

The following graphs represent the trend forecasts. As stated previously in the event forecast, the use of upper and lower mean deviations from the median softens the possibility of a small group of individuals from skewing the data. This was used on all graphs even though there may have been a close consensus on the issue.

Table 15

## Trend 1

### Fiscal Environment

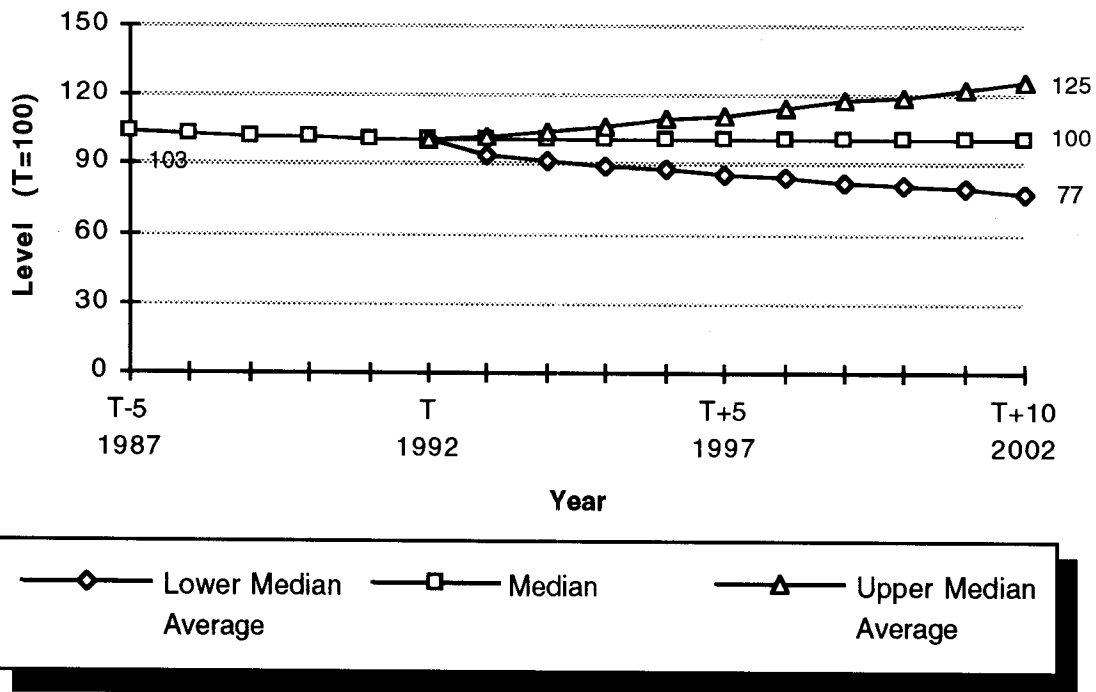


The most significant trend affecting emerging technologies is that of a negative downturn in financial resources. The panel forecasts that the level of funds will diminish modestly during the next ten years. This in turn impacts law enforcement resources necessary to cope with increasing traffic congestion. Five years ago, there was 10% more resources available reflecting that by 1992 the fiscal crisis had begun to take its toll. Unfortunately, the next several years may be just as bad. As it relates to emerging transportation technologies, the panel forecast that funds will slowly continue to diminish for at least the next ten years. In five years there will be 9% fewer resources available than there is today, and in ten years there will 13% fewer resources. Considering past inflationary trends, the value of the dollar will be negatively impacted.

Table 16

## Trend 2

### Alternate Modes of Transportation

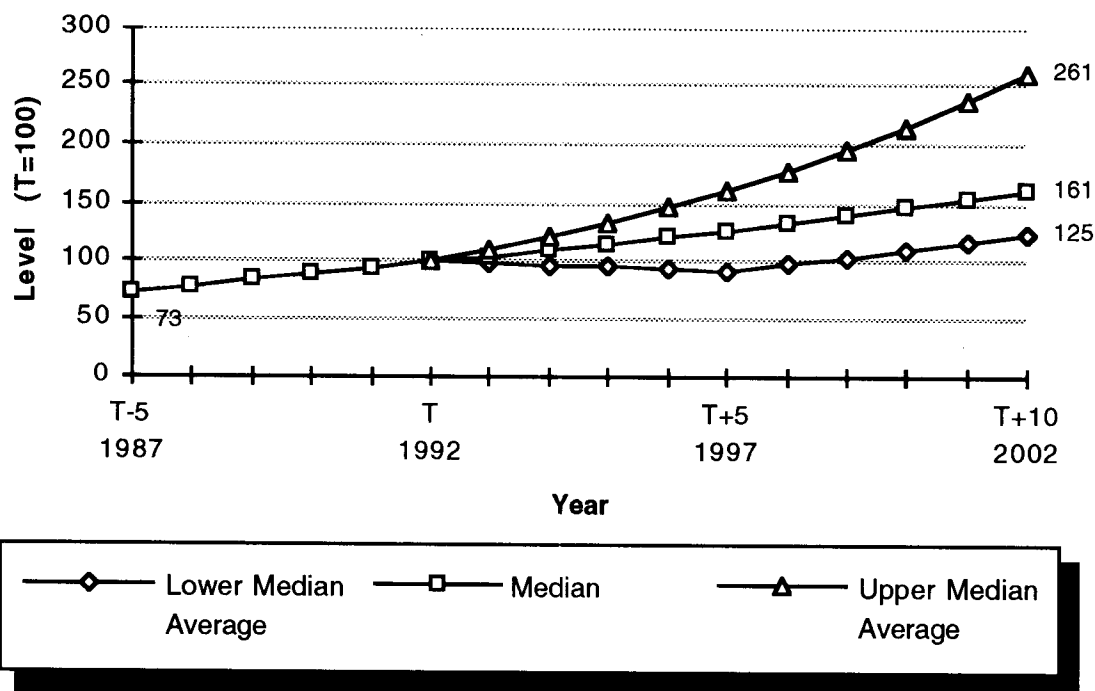


As previously indicated the panel forecast that the personal vehicle will remain the primary mode of transportation. It is interesting to note that this forecast remains constant at 100% throughout the next ten years and that there is little variance in the upper and lower median averages. Five years ago the personal vehicle, as the primary choice for transportation, was only 3% greater than in 1992. This will negatively impact the acceptance and ultimate implementation of emerging transportation technologies.

Table 17

### Trend 3

#### Level of Demand For Traffic Information

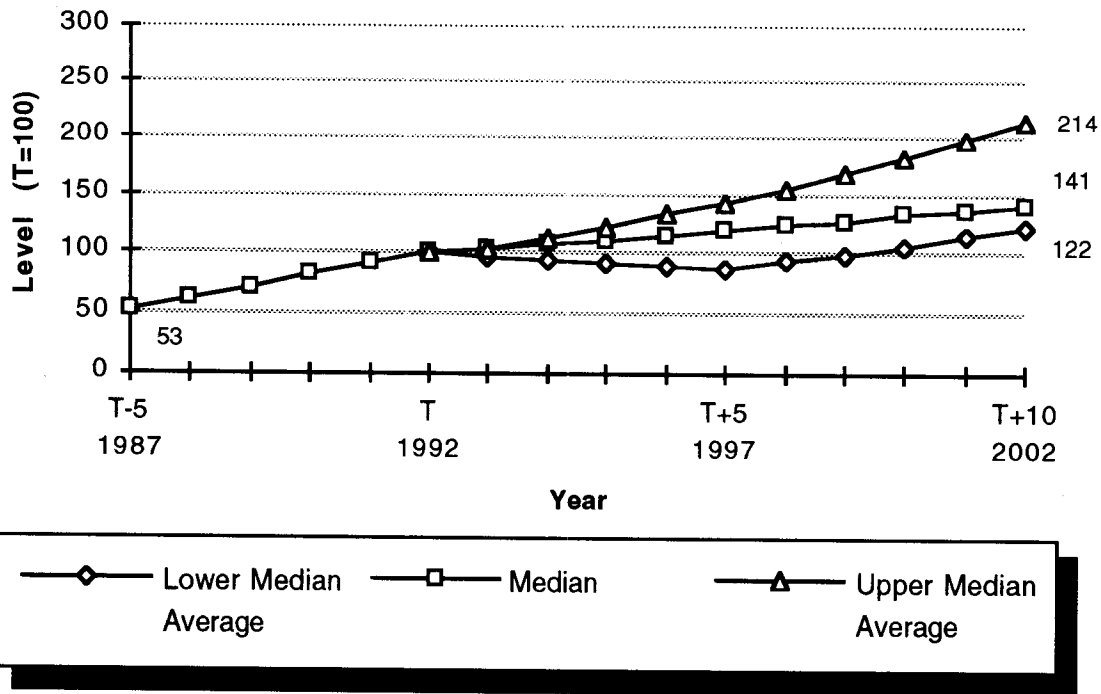


Between 1987 and 1992 there has been a gradual increase in the need for traffic information. By 1992 the public has come to rely on morning traffic reports advising of impairments to free flowing traffic to plan their most expedient route to work. During the next ten years the public will demand even more information about commuting. This will especially be true if the primary mode of transportation is still the personal vehicle. In five years it is forecast that the demand for traffic information will increase 27%. In ten years the need for information will increase 61%.

Table 18

## Trend 4

### Amount of Use of Mass Transit For Commuting

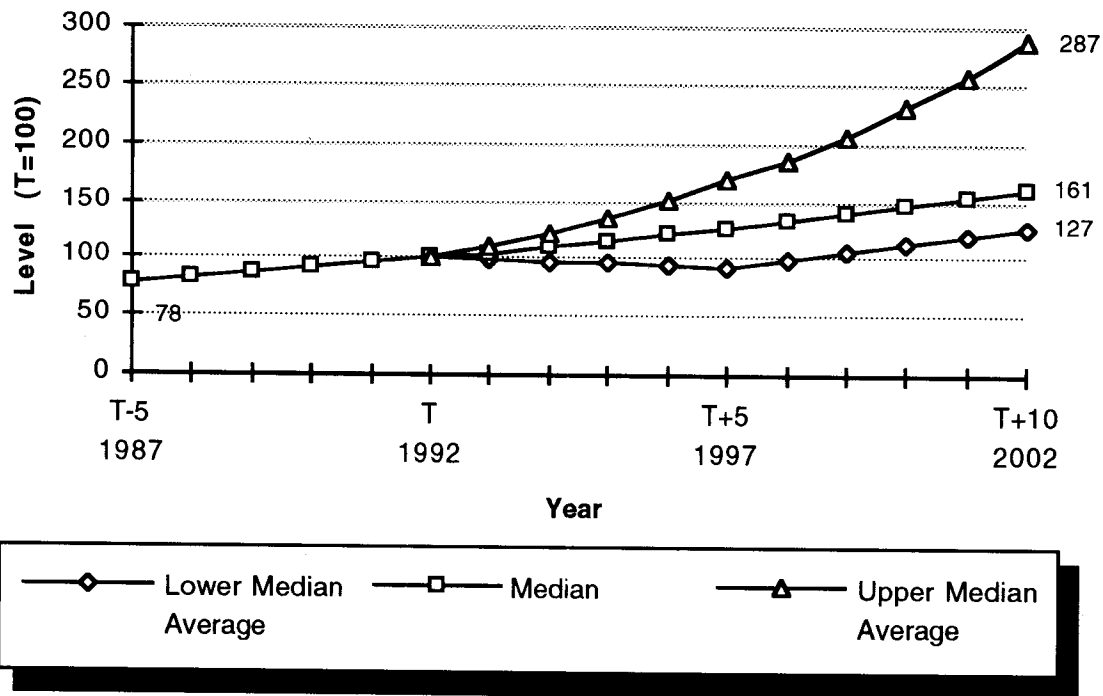


Although in Trend Two it was indicated that the personal vehicle will remain the primary mode of transportation, the panel forecast that the use of mass transit will gradually increase over the next ten years. However, in order to accomplish this increase, mass transit will have to become more affordable and more convenient than it is today. Five years ago the public was 27% less interest in using mass transit than they were in 1992. Beginning in 1993, a very slight increase is noted. In 1997 the use of mass transit will rise to only 19%. At the end of 2002 there is only a 41% increase.

Table 19

## Trend 5

### Efficient Use of Government Resources Funds Transportation Technologies

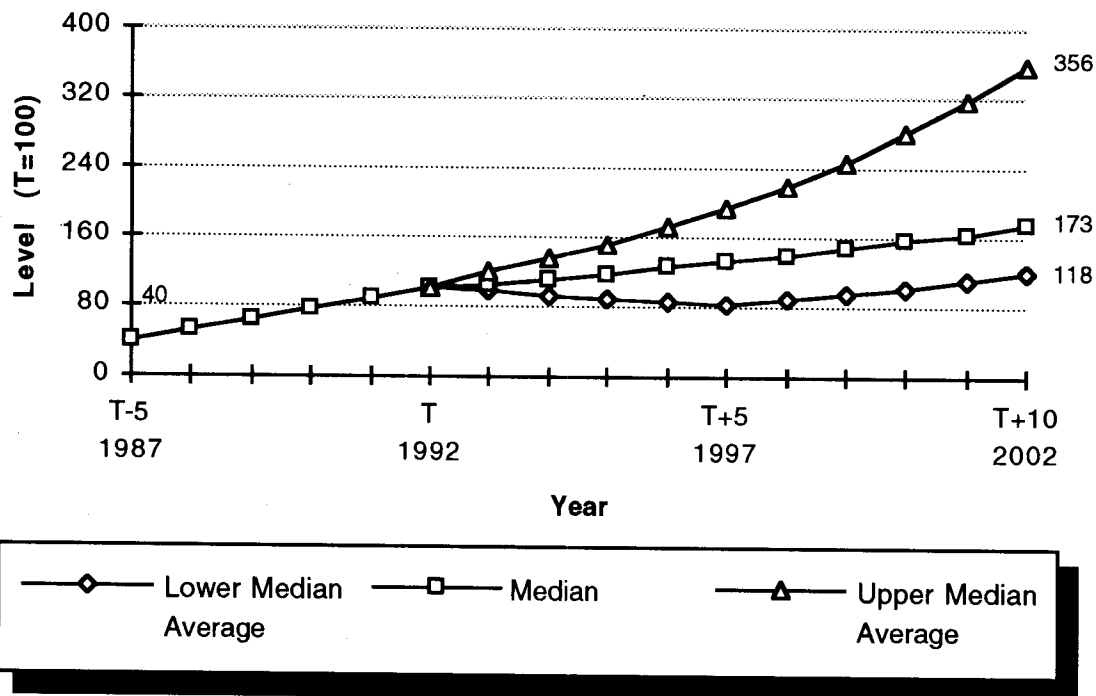


Due to budget shortfalls and dwindling resources, there is a concerted effort to make efficient use of what resources are available. This mandates that government entities become as efficient as possible. No longer can government entities afford to waste money as a result of bureaucratic red tape. Regardless of the pressures the forecast on making government more efficient in the next ten years is a disappointing 61%. The graph shows a very slight and gradual increase in efficiency beginning in the first year. By year five the increase is 27%. After the fifth year, there is a steady increase until it reaches 61% in the tenth year. In looking at the median deviations, some members of the panel believed the efficiency would increase nearly three times of what it is today. Others, although forecasting that it would get worse initially, wound up believing that efficiency would increase a mere 27% by the tenth year.

Table 20

## Trend 6

### Privatization of Transportation Management

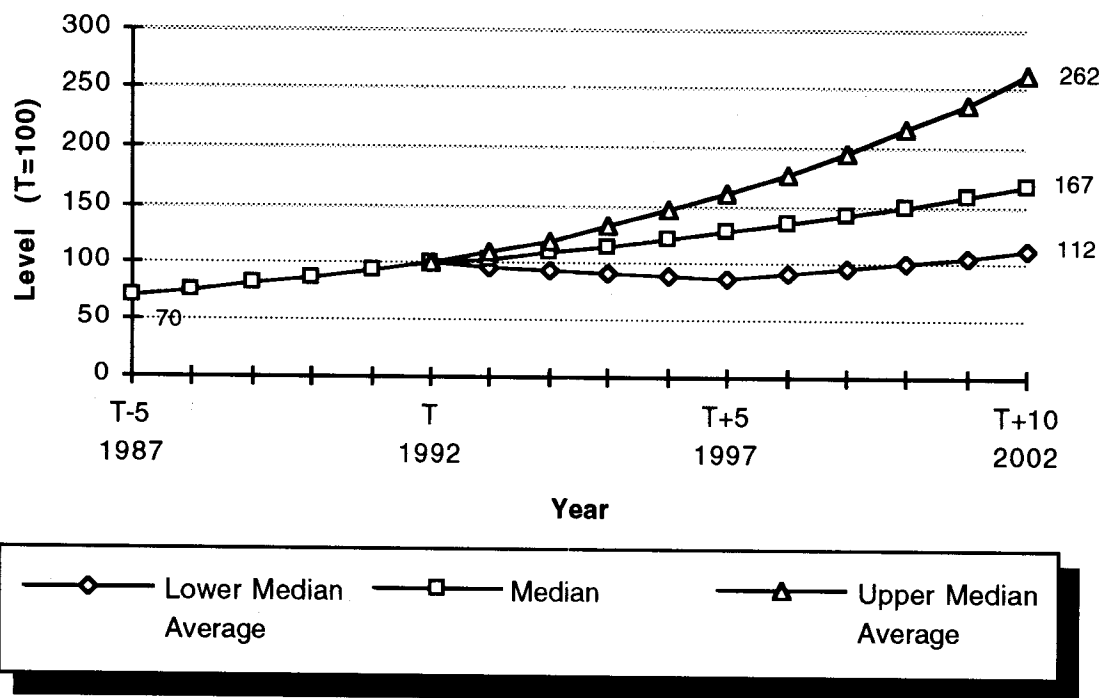


In today's competitive market, the contracting of government services is a primary method of saving money. The graph indicates that five years ago this concept was 27% less likely to be accepted. After 1992 there will be a gradual increase in privatization. After 1997 the increase continues and reaches 73% by 2002. It is interesting to note the upper and lower mean averages. Professionals in the panel who are accustomed to contractual services indicated that privatization of traffic related technologies and law enforcement services will rise nearly 3-1/2 times in the next ten year period. On the opposite end, law enforcement representatives indicate a slight decrease for the first five years and a modest 18% increase in ten years.

Table 21

## Trend 7

### Traffic Related Violence



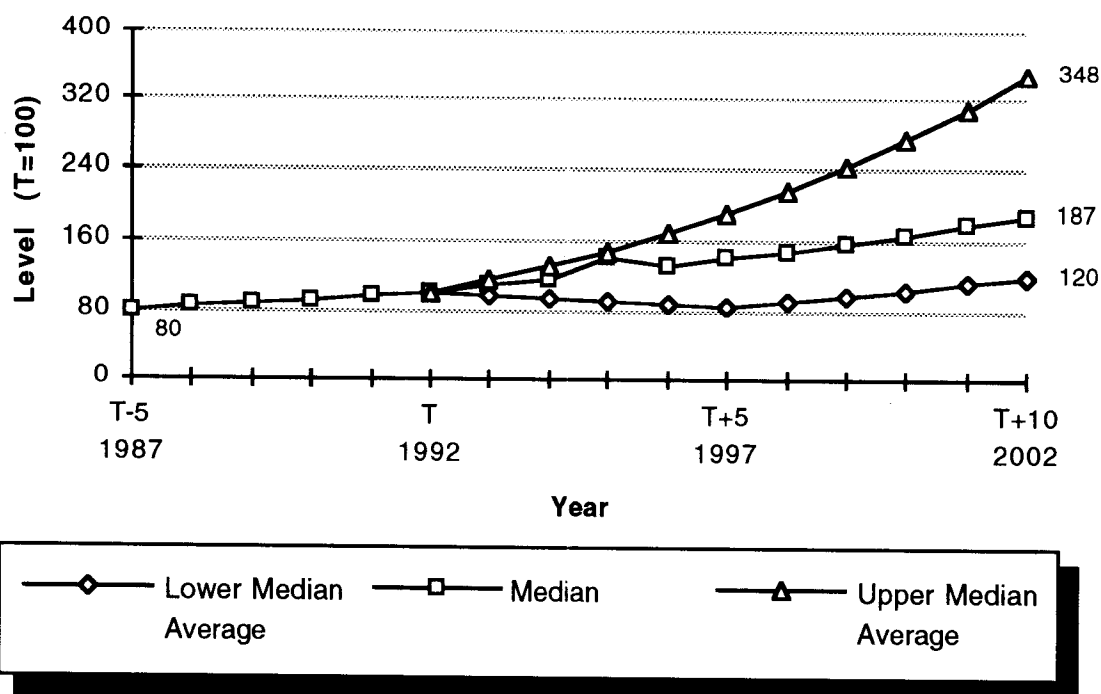
Although in 1987 traffic related violence was 30% lower than in 1992, a marked increase is noted during the next ten years. In this period, congestion on the nation's highway systems continues to test the patience of motorists. As a result, traffic related violence is becoming commonplace as more tempers flare. Unfortunately, it is forecast that this trend will continue. There will be a 28% increase in traffic related violence by 1997. After 1997 violence will continue its gradual rise until it reaches 67% in 2002.



Table 22

## Trend 8

### Influence of Special Interest Groups/Politics In Implementing Transportation Technologies

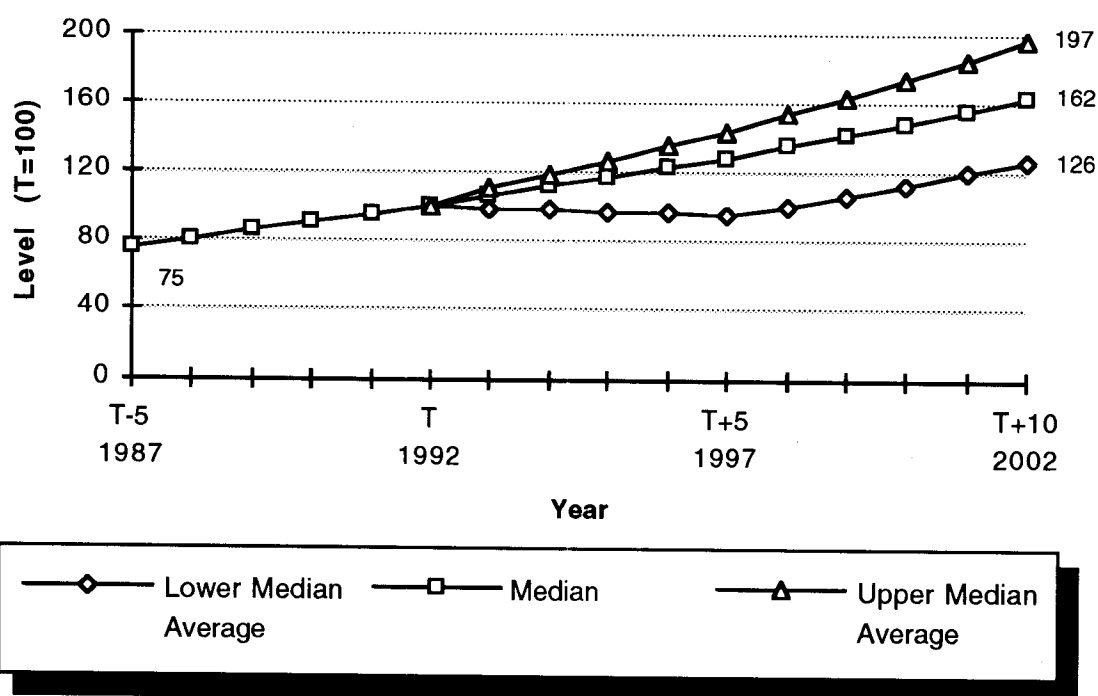


Implementing new traffic technologies is closely scrutinized by special interest groups and politics play an important role. It is forecast that by 1994 there will be a slight rise in the influence of the special groups. In the third year there is a significant rise with a slight downturn occurring in year four. A gradual upward trend begins again in 1997. This continues until there is an 87% increase in the influence of special interest groups/politics in 2002. It is interesting to note the upper median averages. There were some panel members who predicted that special interest groups and politics would play a significant role in implementing new traffic technologies, nearly 3.5 times the median.

Table 23

## Trend 9

### Level of Alternate Funding Sources

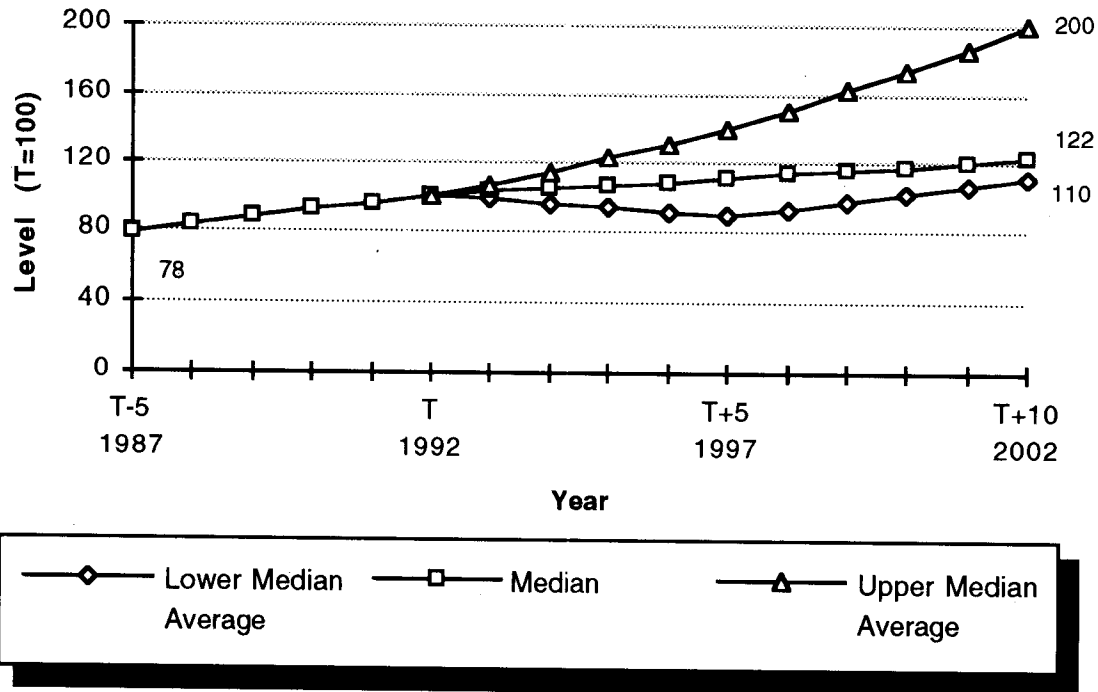


As indicated in trend one, diminishing resources is perhaps the single most important obstacle in implementing emerging technologies. From 1987-1992, the economic structure of the country, as viewed by the panel, was somewhat stable. Correspondingly, the panel forecast that the need to identify alternate funding sources was 20% less than in 1992. By 1997 it is apparent that the identification of alternate funding sources will be the only means of overcoming fiscal constraints. It is predicted that the need to identify alternate funding sources will increase gradually throughout the next ten years. In 1997 the need will be 28% greater and in 2002, 62% greater. It is also noteworthy that some members believed that the need to identify alternate funding sources would decline for the first five years then begin to rise, reaching a modest 26% increase in the tenth year.

Table 24

## Trend 10

### Amount of Change in Attitudes and Abilities of Drivers



In Trend Two it was forecast that the personal vehicle will remain the primary mode of transportation into the 21st century. The panel also forecast that with the population getting older, there will a significant decline in the abilities of drivers using the highway systems. While the panel forecast that there will be a slight but gradual increase in the attitudes and abilities of drivers, they felt that these attitudes would be more negative than positive in nature. In 1997, there will be a 10% increase, with a modest 22% increase by 2002. In looking at the upper median average, there were some panel members who felt that this negative impact would gradually increase and be twice what it is today. In 1987 the negative concern regarding the aging population was 22% less than it was in 1992.

## CROSS-IMPACT ANALYSIS

Once the event and trend forecasts were tabulated, a cross-impact matrix was used to record the numerical values assigned. The cross-impact analysis is a technique for identifying the impact of specific events of well defined policy actions on other events. It explores whether the occurrence of one event or implementation of one policy is likely to inhibit, enhance, or have no effect on the occurrence of another event.

The occurrence of each event was individually assumed at a point in time of its greatest impact on each of the other events and of the trends by the NGT panel members. Starting with this assumption, the analysis was completed by the use of a cross-impact matrix. The maximum impact of each event on each other event and on the trends was estimated in terms of percentage change (plus, minus, or zero). Table 25 displays the impact medians of the NGT panel.

Table 25

### CROSS IMPACT EVALUATION (EVENT/EVENT)

#### IMPACTED TRENDS

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
E1		-50	0	-25	80	50	0	25	-80	100
E2	-60		-70	-60	0	-100	25	75	-90	0
E3	-15	-80		0	0	-75	-95	0	-80	-100
E4	75	30	75		10	0	25	50	0	90
E5	-80	-75	20	0		0	0	50	0	70
E6	-75	-80	0	0	-50		0	0	-90	-15
E7	60	75	0	5	10	0		0	80	0
E8	60	70	0	10	75	25	0		0	20
E9	-90	-85	0	-25	0	-90	10	0		0
E10	25	20	0	10	75	60	0	35	0	

## EVENTS

<b>E1</b>	Statewide traffic management agency created.
<b>E2</b>	Transportation technologies require greater law enforcement response.
<b>E3</b>	Funding is unavailable to implement technology.
<b>E4</b>	Gridlock as a result of a recovering economy.
<b>E5</b>	Traffic management becomes an environmental issue leading to court mandate for law enforcement action.
<b>E6</b>	Catastrophic collapse of roadway network requires law enforcement response.
<b>E7</b>	Completion of digital cellular technologies (PCD's).
<b>E8</b>	AQMD mandates minimum 4 passenger per vehicle ratio during commute hours.
<b>E9</b>	Failure of information infrastructure.
<b>E10</b>	Magnetic Levitation train redefines long distance travel in the United States .

The completed analysis matrix indicates that all of the events are somewhat equally significant. E-1, E-2 and E-3 appear to have the most impact on other events or trends should they occur. Two relate specifically to increased traffic congestion that will require additional law enforcement resources. The other relates to the creation of a Statewide Traffic management agency that, if created, will more efficiently manage the State's transportation networks. E-5, traffic management as an environmental issue needs to be recognized for its potential impact on law enforcement should court mandates require some type of enforcement action. Also significant is the potential negative impact of E-6 and E-9 as it relates to a total collapse of the State's highway and information systems (major earthquake, nuclear disaster etc.).

The trends which were forecast to be most impacted by the occurrence of events were T-1, T-9 and T-10. Two of these trends relate to the fiscal environment--the lack of money and alternate funding sources that will hamper future implementation of transportation technologies. The other, (T-10) relates to the attitudes of drivers and their willingness to adapt to alternate means of transportation. T-10 also addresses the abilities of drivers as the population in the United States grows older. Funding and acceptance by the public is instrumental in bringing about the technological changes necessary to effectively manage the ever increasing traffic congestion.

## SCENARIO DEVELOPMENT

Computer software was used to develop alternative futures based upon the originally generated trends and events (10 each) from the NGT. The following data was entered to provide the tables from which to develop alternative futures: <sup>8</sup>

- Event-to-event cross-impact matrix results
- Event-to-trend cross-impact matrix results
- Cumulative event probability for 10 events
- Median forecasts of 10 trends

The program compiled and correlated the sets of input data and generated 100 iterations of alternative futures. Two iterations were then selected from the 100 to be developed into scenarios to compliment the "most likely" scenario developed in the NGT. The two scenarios were selected for their unique and interesting futures.

The three scenarios developed provide a window to the possible future. Each scenario is written from a historical perspective, looking at the forecasted events and trends as if they had actually occurred. The three types of scenarios are:

**1. Nominal/Exploratory** — A "play out" or "surprise free" future. The forecasted events did not happen. Rather, issue-related events that have been occurring will probably continue with a potential for influence. Medians of the "will be" trend forecasts complete the scenario.

**2. Normative** — A "desired and attainable" future. It concentrates on positive actors and positively impacted events from trend and event forecasts, and blends in "good news" data from the future file.

**3. Hypothetical** — This is a "what if" scenario with a hypothesis of, "what if" a select number of events all actually occurred.

Each of the three following scenarios were written in the format of a staff report and based on forecasted trends and events of the NGT panel. The perspective begins in 1992 and concludes in the year 2002.

#### **SCENARIO #1 (NOMINAL - MOST LIKELY)**

A number of new vehicle and transportation technologies will be developed during the 1990's. Auto manufacturers were required by law to equip all vehicles with anti-lock brakes, driver and passenger air bags, in-vehicle navigation systems and anti-collision avoidance warning devices. All vehicles manufactured before 1995 will be required to be retrofitted with these new technologies in order to use the new high speed highway network systems that will see limited operation by the turn of the century.

Although there have been significant gains in the development of rapid transit, construction of magnetic levitation trains and automated powered roadway systems will be delayed for several more years because of diminishing resources. Current budget problems and the increasing national debt will continue to plague California. It is expected that resources will diminish gradually during the next ten years. In 1997 it is forecasted that there will be 9% fewer resources available than today. By the year 2002 this will increase to 13%..

Diminishing resources will be the single most insurmountable obstacle affecting the implementation of emerging transportation technologies. The identification of alternative funding sources will be the only means by which these obstacles can be overcome. No new taxes will be forthcoming. Gas taxes, already at \$2.00 per gallon, will not be sufficient to cover the costs of planned rapid transit systems.

Law enforcement personnel will be charging at-fault parties for response to emergency incidents, the investigation of traffic accidents, and the removal of damaged vehicles. These charges as well as others will be used to fund additional personnel required to maintain minimum staffing levels.

Congestion will increase because emerging technologies designed to alleviate congestion, although available, will not be implemented due to the lack of funding. California roadways will not be able to keep pace with the expected influx of 41% more licensed drivers by the year 2010. In spite of efforts to educate the public on the values and necessity of mass transit, the personal vehicle will remain the primary mode of transportation for at least the next ten years. The only outside influences that will have an impact on this forecast are a significant rise in the price of gasoline and more economical and convenient modes of rapid transit. However, the prediction that the use of mass transit will increase any time soon is slight - 19% in five years and 41% in ten years.

Law enforcement will be unable to redirect resources from traffic responsibilities to other areas of need and will require additional personnel to respond to increasing demands for information and services. This will also occur during the same time that law enforcement budgets are declining. As indicated previously, law enforcement will be charging user fees for most of the services that they now provide free of charge.

The demand for more sophisticated traffic information systems will continue to increase over the next ten years. In a mere five years that demand is expected to be 27% greater than it is today and in ten years it will rise to 61%. Furthermore, the increased demand will require more complex monitoring systems and trained technicians to monitor and direct resources to high congestion areas. Without these systems in place, the forecast that the average commute time in California will rise from 45 minutes to two hours could become reality.

Because of budget shortfalls and dwindling resources there is a concerted effort to make government much more efficient.



Government entities can no longer afford the luxury of wasting money as a result of bureaucratic red tape. However, regardless of the need to do more with less, changing how the government does business will prove to be very difficult. It will take at least five years for the government to become 27% more efficient than it is today. Government in ten years will be a disappointing 61% more efficient. In the interim, billions of dollars will be wasted that could have been directed towards enhancing public services. Available new technologies that would have made government even more effective and efficient have not been implemented because of the lack of funds.

Privatization will slowly emerge as the primary method by which government can become more efficient and cost effective. By contracting for services government entities will be able to provide a higher level of service to the public. The cost of employee benefits such as retirement, sick leave and health care will be borne by the contractor as will escalating worker's compensation costs. Duplication of effort between the public and private sector will also narrow. And in spite of the efforts of special interest groups and politicians, privatization and government efficiency will become more commonplace in the 21st century but not before more money is needlessly wasted.

All new emerging traffic technologies will be closely scrutinized by special interest groups. Politicians who do not represent the interest of their constituents, but who are solely reactive to the demands of these special interest groups will needlessly delay implementation of technology. While they are debating the need for implementation, traffic congestion will continue to increase. The changing attitudes of drivers will spur more violence as patience wears thin during more lengthy commutes.

As indicated earlier, the personal vehicle will be the preferred choice of travel into the 21st century. As the baby boom generation becomes older the numbers of elderly drivers will increase. As a result, there will be a gradual decline in the ability and attitude of drivers into the year 2002. There will also be more accidents and a greater need for law enforcement to respond to these incidents.

In conclusion, the lack of funding to implement new traffic technologies will continue to have an adverse impact on traffic congestion. Rapid transit will be slow in both development and acceptance as a viable alternative to the personal vehicle. Commute times in metropolitan areas will continue to rise. Instead of fewer resources required to manage traffic responsibilities, law enforcement agencies will need more personnel to meet the increasing demands for services and information.

### Scenario #2-(Normative)

Diminishing resources continue to plague government entities in California. Beginning in 1993 a negative upward trend will emerge and rise rapidly by 1996 to 148% of today's available resources. Significant cuts in the budgets of government entities will occur resulting in only the minimum services being provided. Many agencies will either cease to exist or merge like services in an attempt to become more efficient. In 1997 there will be some improvement but funding will be not be anywhere near 1992 levels. At the turn of the century levels of funding are expected to return to the same levels as the early 1990s. Available new transportation technologies have not been implemented due to the lack of funds; resulting in severe traffic congestion in urban cities. Rapid transit as a means of convenient and economical transportation does not exist. Law enforcement has had to double the number of personnel assigned to traffic responsibilities in order to keep pace with congestion and the rising rate of violence.

To impact diminishing resources and provide the level of services the public has come to expect, alternative funding sources will have to be identified. This need is immediate, reflecting a 123% increase in 1993. Only if these sources are identified will transportation technologies forge ahead. All aspects of transportation technologies, including development and implementation, as well as law enforcement, will have an impact on the identification, or lack of identification of these resources. It is projected that the need to identify alternative funding sources will decline somewhat by 1997, continue a slight downward trend in 1998, then sky rocket to more

than 2 1/2 times of what it is today by the year 2000. This does not coincide with the predictions for diminishing resources that are expected to level off by the turn of the century, but reflect that the return to the early 1990's funding levels will be inadequate to meet the needs of emerging transportation technologies into the 21st century.

The use of the personal vehicle as the primary mode of transportation will remain constant through 1994. However, in 1995, the movement to educate the public on the benefits of rapid transit systems, and the recent rise in the price of gasoline, has forced commuters to consider alternative forms of transportation instead of the personal vehicle as a means of commuting. In 1995 there will be a slight regression in this trend and the use of the personal vehicle for transportation purposes will rise slightly. There will be some sporadic fluctuation as commuters struggle with acceptance of the new methods or are unsure if they want to give up the convenience of the personal vehicle. Use of the personal vehicle as the primary mode of transportation will level off and maintain a 50% reduction through the end of 2002.

Consistent with the above trend, the need for increased use of mass transit is evident. Through 1996 however, there seems to be a reluctance on behalf of the public to use the new transportation systems that came on line at the end of 1992. This is due to the inconvenience one must endure in getting to their destination once they arrive at the transit station.

In 1997 several toll roads were completed and their opening sparked a return to the personal vehicle as the primary mode of transportation. Decline in the use of mass transit will continue through 1998. However, the cost of gasoline is expected to rise sharply for a second time this decade at the beginning of 1999 and this increase will again spur an interest in the use of mass transit. As the world approaches the 21st century the use of mass transit for commuting will remain a matter of indifference to the commuter.

Implementation of traffic information systems has been inconsistent primarily due to the lack of funds. As a result, public confidence as well as the demand for transportation information have been low. Improper information has affected the credibility of information released to the public and the current systems have been ineffective in notifying the public of major incidents affecting traffic. While the need exists for more accurate and up to date information, and the technology exists, little will be accomplished by the end of the century to upgrade our information systems. In fact, there will actually a decline in the demand for these services.

Budget shortfalls continue to have an impact on the efficient use of government resources. By 1997 government entities will become 2 1/2 times more efficient than they are today. These gains will be attained because agencies will be held accountable for their budget expenditures and will be allowed to seek a more entrepreneurial approach to managing resources. In terms of saving dollars, this will allow agencies to maintain their status quo in spite of dwindling resources. However, because this approach is somewhat new government will experience sporadic periods of increase and decrease in efficiency. Regardless of the variances, by the end of the century government will be more than twice as efficient as they were ten years ago. The introduction of privatization has also had a significant impact on the efficiency of government.

With the near collapse of California's economic infrastructure late in 1993, government finally realized that contractual services were a viable alternative to saving money and reducing government costs. Privatization of services in the form of contractual services will increase sharply throughout 1995. There will then be a slight decrease as the economy improves.

Special interest groups in the form of union representation will become more active in the legislature fighting to return to the early 1990's form of government. However, in 1999 there will be a resurgence of acceptance for the policies of privatization and the practice will gain a strong foothold into the year 2002. The result will

be more efficient and cost effective government without the attendant rising employee costs to maintain expected levels of service.

Unfortunately, special interest groups and politics will continue to delay the implementation of emerging traffic technologies. This will have a negative impact law on enforcement in their ability to provide services. These groups will closely scrutinize new technologies and lobby politicians in attempts to sway the decision making processes to address their concerns. This will occur as soon as 1993 and continue throughout the next ten years; nearly doubling by the year 2002. Delays in implementing the available technology will cause needless traffic congestion and spur already increasing violence associated with more lengthy commute times.

Due to the lack of progress in implementing new traffic technologies during this decade, traffic congestion has needlessly reached unmanageable levels. Instead of law enforcement being able to shift resources from traffic responsibilities to other assignments, law enforcement has had to identify additional personnel to cope with increasing problems. Violence has become widespread as the average commute time approaches two hours.

The trend for increased violence will begin in 1994. There will be slight increases in 1995 and 1996. Then in 1997, violence will increase significantly. In 1998 violence on transportation networks will peak at more than twice the rate of violence experienced during the early 1990s. The President will keep his campaign promise and commit additional resources to law enforcement in an effort to address the increasing violence. We will then see a slight downturn in the rate of violence. The President will also direct additional funds to transportation and encourage the development of more economical and convenient rapid transit.

It is forecast that the personal vehicle will remain the choice of primary transportation into the 21st century. The number of elderly drivers using the transportation networks will rise significantly, to an average age of 56. It is also a well-known fact that as the population gets older reflexes will slow, hearing will decline, and one's vision

begins to fail. Consequently, an individual's ability to operate a motor vehicle is adversely impacted. This will translate into a need for more services as the number of accidents rise. Drivers' attitudes have also been changing but not towards the positive column.

As congestion increases so will stress. Commute time will approach the two hour mark and tempers will be very difficult to control. Some drivers will become more aggressive in their driving behavior and display more violent attitudes. There will be noticeable change in attitudes and abilities of drivers as early as 1995. In 1997 the negative abilities and attitudes of drivers will be twice what they were in the early 1990s. After that there will be a steady decline in negative attitudes and a return to some semblance of normalcy. By the year 2002 experience will be at the same level of violence as in 1992.

In conclusion, there will be little if any improvement in the availability of resources to implement transportation technologies in the next ten years. This will be in spite of government's accomplishments in streamlining operations, enhancing efficiency, and being very creative in identifying alternative funding sources. Again, the use of the personal vehicle will remain the primary mode of transportation into the 21st century, creating needless congestion. The demand for information and traffic related services will overburden the resources of law enforcement requiring additional personnel to maintain the levels of service demanded by the public. Finally, special interest groups and politics will continue to delay the implementation of much needed rapid transit systems.

### Scenario #3 Hypothetical

Although the economy nationwide has shown improvement and the recession is considered to be over, in California these problems will continue to linger into the 21st century. California has been unable to recover due to a dependence on aircraft and defense contracts in the early 1990s. When these industries collapsed, there was a significant negative impact on California's tax base. In 1995 there will be some short lived signs that the economy will improve. However, shortly

thereafter the remaining aircraft industries will either close their doors or move from the state to a more attractive location. As a result, California will again experience significant economic problems.

By 1999 there will be nearly three times fewer resources than there were in the early 1990s. After 1999 there will be some improvement in this trend but never again will there be as much money to spend as there is today. The diminishing resources will have an adverse impact on all emerging transportation technologies by delaying implementation. It will also impact law enforcement's ability to provide information and services as increases in traffic congestion continue to plague the metropolitan areas of the State.

In the early 1990's there was a need to be extremely creative in identifying alternative revenue sources to implement emerging transportation technologies and mass transit systems. Law enforcement also responded to this need by transferring the costs of services to the public by instituting user fees. Unfortunately, by the end of 1995 all alternative funding sources were exhausted. The need to identify these sources fell drastically during the next two years reaching a negative 15%. Not until the year 2002 will the need to identify alternative funding sources again become of some importance. This trend coincides with the projections for diminishing resources to continue into the 21st century.

Through 1997 there has been increased use of the mass transit systems that came on line during the mid 1990's. The public appears to have relaxed their reliance on the personal vehicle as the primary mode of transportation. However, in 1998 and 1999 significant increases in the use of personal vehicles for commute purposes will be seen. This is due to the lack of care and maintenance of rapid transit systems brought about by the continuing decline in available funds as a result of hard economic times.

Another factor to be considered in this increase is the introduction of the new automated powered roadway system and vehicles that will leisurely carry one to their destination at high speed. In the year 2000 the new magnetic levitation trains will be gradually

coming on line and they will spur new interest in the use of mass transit through the year 2002. When these trains are fully operational, the personal vehicle as the primary mode of transportation will decline significantly.

In the years prior to 1997, there was sporadic interest in the use of mass transit. Popularity peaked in 1994. Then as indicated previously, interest will decline significantly because of the lack of maintenance. After 1997 the attractiveness of mass transit will skyrocket, reaching levels of more than 3 1/2 times of what it was during the early 1990s. This will occur because of renewed efforts to make mass transit economical and cost effective. Also impacting this trend will be the implementation of high speed magnetic levitation trains.

Through 1994 there will be increased demand for traffic related information. However, as rapid transit becomes more popular there will be a slight decline in the need for this information. The demand for information will peak at its lowest point in 1997. From there, one will see a gradual but steady rise in the need for transit information; increasing to more than 2 1/2 times of what was required in the early 1990's. There is no explanation for this increase other than to speculate that the public wants to become more informed on daily commute issues.

In 1994 the public will demand that government becomes more efficient when the Presidential commission publishes its report on government waste. The crux of the report will be that the tax payer is tired of being taxed in order to subsidize government inefficiency. The commission will recommend that government take a more entrepreneurial approach to doing business. As a result, many of the regulations that have cost government billions of dollars will be revised or eliminated.

By the end of 1995 government will be almost twice as effective as it has in the past. Then for the next six years, as special interest groups and politics attempt to attack the new found freedoms, there will be sporadic increases and decreases in government efficiency. In



spite of their efforts, by the year 2002 government will be 2 1/2 times more efficient than they were in the early 1990's.

Privatization will continue to be a factor in influencing the efficiency of government for at least the next ten years. The trend of private organizations providing contractual services for government entities will begin in 1994. There will be a sharp increase in 1995 and then level off gradually during the next five years.

The use of private entities will also help spur the economy and will account for part of the recovery that will be experienced at the end of the century. The cost savings of private contractual services to government will be significant. Moneys saved from employee benefits such as retirement, sick leave, vacation, health care, and worker's compensation costs, will be used to augment specialized law enforcement functions.

Beginning in 1994 there will be significant rises in the activities of special interest groups in attempts to thwart the efforts of government to become more efficient. These efforts will be led by employee unions attempting to retain control over labor issues and the movement towards contractual services. In 1995, lobbying by special interest groups to impact political decisions will be twice what it was just a year earlier. For the next seven years this trend will remain fairly constant with only slight variances. In 2002 it will be at the same level as in 1995.

Politics and special interest groups will also be responsible for the delays that will be experienced in implementing emerging transportation technologies and rapid transit systems. The public's impatience with the current political system will be reflected in the 1998 elections as both the House and the Senate incur sweeping changes in their current composition. However, special interest groups as self appointed watch dogs will continue their relentless efforts to influence the political decision making processes regardless of the importance of the issues at hand.

In the early 1990's the attitudes of drivers changed considerably as traffic congestion increased. Sporadic incidents of violence on the freeway systems were commonplace. However, as mass transit and other forms of transportation come on line this trend will start to decline. Unfortunately, by 1997 there will again be a number of changes in driver's attitudes. This will be due to increased congestion when a renewed interest in the private vehicle as the primary mode of transportation emerges. This congestion will again spur violent attitudes. At this same time there will be a significant rise in the average age of the California driver. As America's population gets older, the abilities of its drivers will also decline. There will be higher incidences of traffic collisions and requests for information which in turn will require additional law enforcement responses.

As indicated above, traffic congestion will spur additional violence on our urban highway network systems. The public is highly agitated at the lack of progress in implementing economical and efficient mass transit systems. They are in essence refusing to give up their personal vehicle as the primary mode of transportation. And in spite of their complaining, the public will not authorize the additional taxes needed to fund new transportation technologies. The negative attitudes of drivers trying to cope with average two hour commutes have become unmanageable. Violence will become widespread. This trend will begin its upward movement as early as 1994. From there will be a steady rise until it reaches its peak in the year 2000, at nearly three times of what it was at the beginning of the century. After the year 2000 there will be some relief as the rate of violence declines slightly. This will occur as law enforcement resources are augmented in an effort to reverse the upward trends of violence.

In conclusion, this scenario offers little hope of progress into the 21st century in implementing rapid transit systems. This is due in large part because of the lack of dedicated funds and the negative attitudes towards use of these systems. The public will not give up the perceived freedoms they enjoy with their personal vehicle. Traffic congestion and commute times will increase as the population grows; especially in the urban cities. Violence as a result of these delays will increase significantly. Law enforcement resources that have seen a

steady decrease during the 1990's will be severely taxed to provide quality services and respond to the increasing violence on transportation systems. The only foreseen benefits are that government, due to the lack of funds, has been forced to become more efficient and very creative in identifying alternate funding sources.

### CONCLUSIONS

Looking back at the three scenarios there is little variation. The outlook for the future is bright in terms of the technologies that will exist to make life easier and more enjoyable into the 21st century. This is especially true of emerging transportation technologies. Unfortunately, this progress is predicated on the availability of funds. The economy is poor on the national level and is even worse in California. There is little or no chance of the economy improving significantly by the year 2000. Government entities because of the lack of funds will have fallen so far behind the private sector in terms of technology and ability to provide services that it will take several years to even begin to catch up. This was also the consensus of the panel of experts that was assembled to assist in this futures forecast. ***Never again will there be as much money to spend as there is today.***

There are a number of emerging transportation technologies and rapid transit systems that will revolutionize travel as it is known today. Because of the costs and number of entities involved, the primary market for implementation of major transportation technologies traditionally has been government. If government has no money, and the public is not willing to pay more taxes, how will these new systems be implemented? The Nation cannot even keep pace with the required maintenance of current transportation networks.

Nevertheless, what the public can expect to see by the end of this century in new cars is high technology safety equipment. Even though speeds on highway systems may increase as a result of technology, the safety equipment currently being developed will have a significant positive impact on the mileage death rate. Vehicles will also be much more compatible with the environment.

Initially it was believed that with the implementation of new transportation technologies personnel assigned to traffic law enforcement responsibilities could be assigned to other duties. This was assuming that the technology worked as designed and that there would be widespread use.

In reality, it appears that just the opposite will occur. Although the technology will exist, lack of funding will deter or prevent its implementation. With the projection that the population in California will continue to increase, some 18 million more people by the year 2010, and the fact that there will be more elderly drivers on the roads, there will be a need for more law enforcement personnel to respond to greater demands for service. Present staffing levels of personnel assigned to traffic responsibilities are already inadequate and this will not improve by the turn of the century. Traffic congestion and commute times will become even more unbearable and extremely difficult for law enforcement to manage before there is any improvement.

As a result of dwindling resources, the next several years will be extremely difficult for law enforcement. Law enforcement may have to revert to providing only basic services in order to keep pace with the increasing demands that are placed upon them. While the budget shortfalls will make law enforcement, as well as government, more efficient overall, the Nation will fall further behind in the implementation of emerging technologies that could make law enforcement's job more efficient. Executives will have to explore every possibility for alternative funding as well as methods to cut costs. Executives will also have to be extremely cognizant of the changing world and seize opportunities as they are presented. Law enforcement cannot be resistant to change but instead must view it as a means to advance towards the future.

If any law enforcement organization is to survive in the future, or for that matter any government entity, a more entrepreneurial approach to doing business will have to be allowed. Most law enforcement agencies could be somewhat self sufficient if given the opportunity to control their own destiny through the management and

generation of their own revenues. Law enforcement cannot remain dependent on the taxpayer and must begin to move away from this dependency as soon as possible.

It is interesting to note the NGT panel's forecast of future events in the implementation of transportation technologies is somewhat pessimistic. This may be due to the panel being convened at a period of time when California was experiencing a severe fiscal crisis with no foreseeable end in sight. The panel unanimously agreed that technology would exist but that the vast amounts of money needed to implement them would be scarce if not non-existent. Although there would be significant gains in the field of traffic management and transportation technology, the panel believed it would not be enough to offset the State's growing population predicted for the turn of the century. As a result, lack of funding, congestion, and demands on law enforcement will continue to increase. The negative forecast may also be attributed in part to the fact that the majority of panel members were associated with the public sector and familiar with the lengthy processes that government must go through to get anything accomplished.

Just prior to the completion of this research each panel member was recontacted and provided an overview of what had been discussed previously (18 months ago) during the NGT process. Each was asked "In light of what has occurred during the last year and a half would you change any of your previous forecasts"? All of the panel members indicated that there has been little improvement in the economy and until there is, nothing will change. Again it was the consensus that congestion will get worse requiring greater demands on law enforcement to manage traffic.

There have been significant gains in the implementation of mass transit, especially in Los Angeles, Orange, and San Bernardino counties. However, it is reported that despite the expenditure of \$2.6 billion to open three new mass transit systems ridership on public transit systems has declined 23%, a 10-year low. Currently 1.23 million people board busses and trains on an average weekday--compared with an average of 1.6 million in 1985. When fares were 50 cents

ridership was at its peak. As fares reached 85 cents and \$1.10 they began to decline. Overall, there were 107.4 million fewer passenger boardings in fiscal 1992-93 compared to fiscal 1984-85. <sup>9</sup>

This report lends validity to the current attitude that the public is unwilling, at this time, to give up the personal car as their primary mode of transportation. Even though mass transit systems are steadily coming on line, if they are not efficient and cost effective, the public will chose another means of transportation. As a result, the panel's forecast that traffic congestion will increase is still on track.

This researcher however, is somewhat more optimistic and believes that in spite of the panel's forecast that the private sector will not stand by and let newly developed transportation technologies gather dust. Instead, they will spend billions on research and development and will aggressively seek out markets for their products. It may take time, but these technologies will be implemented. When implemented, there will be a significant impact on the way law enforcement approaches and manages traffic responsibilities. To continue on the same path law enforcement merely has to continue what they have been doing for years-- asking for more resources and personnel to do the job. Being futures oriented, this researcher will focus on how emerging transportation technologies will impact law enforcement in the future from the stand point that these technologies will be implemented, that they will work as designed, and that they will significantly reduce traffic congestion. There will be several new opportunities for law enforcement agencies, especially in the field of mass transit if they have ventured a look into the future and are prepared to seize these opportunities.

The remainder of this paper will focus on the California Highway Patrol. The impact will be will be greatest upon this agency because of its specific traffic/transportation related responsibilities. However, the concepts apply to any law enforcement agency, large or small, and afford a look at possible future opportunities in the field of traffic management and mass transit. One of the sub issues originally identified, "What methods will law enforcement use to determine and pay for the cost of implementing change as a result of emerging

transportation technologies"? will not be fully addressed. This sub-issue is extremely complex and is a study in itself.

### STRATEGIC PLAN

Even though the most likely scenario indicates that there will be no change in the way traffic is managed in the future, and in fact predicts that more law enforcement officers will be needed, the following strategic plan will assume that new transportation technologies will be implemented on a wide scale, that they will work as designed and that there will be significant reductions in the need to assign personnel to traffic management responsibilities. The plan will be specific to the California Highway Patrol and address threats and opportunities to assist the CHP in managing and controlling the impact of emerging transportation technologies on their role as a leading influence in the management and regulation of traffic. The plan will also prove valuable as a model for other law enforcement agencies to consider in planning for future traffic management responsibilities.

Strategic planning is the process of formulating and implementing decisions about an organization's future direction. A strategic plan is essential as police administrators look to the future and make decisions today that are consistent with the direction they intend to lead the organization. Strategic planning recognizes that organizations are shaped by both outside and internal forces.

This section of the research includes a situational analysis of the impact that emerging transportation technologies involving vehicles and highways will have on law enforcement. Specifically, how will the California Highway Patrol manage this issue in the future.

The California Highway Patrol (CHP) is a statewide traffic law enforcement agency with 99 field offices, eight field divisions, and a headquarters division located in Sacramento. The CHP is responsible for patrolling 99,000 miles of roadway within California. There are just under 6,000 total uniformed members and 2,500 non-sworn personnel to manage more than 25 million registered vehicles within

the State. The CHP has a budget of \$582 million. In 1992 the CHP wrote nearly 3 million citations and although primarily a traffic law enforcement agency, managed to make 12,500 felony arrests.<sup>10</sup>

In the development of a strategic plan, the overall mission of the agency must be kept in mind so as not to create conflict.

**Macro-Mission Statement** - The mission of the California Highway Patrol is to provide safety, security and service to the public. In carrying out these responsibilities the Department subscribes to the commitment to provide for the safe, lawful and efficient use of the State's transportation networks. It is further committed to supporting local law enforcement by providing disaster and life saving assistance. As a progressive law enforcement agency, the Department is also committed to supporting the development and implementation of new technologies as well as strategies that alleviate congestion and promote the free flow of traffic.

**Micro-Mission Statement** - To reduce accidents and associated injuries/deaths, congestion, highway violence, and vehicle pollution, the Department stands ready to assist in exploring and implementing relevant transportation technologies and to assist in the development of strategies that encourage the wide spread use of mass transit. The Department will also act as a coordinator in fostering the acquisition and implementation of both strategies and the technologies designed to relieve congestion on a statewide level.

The California Highway Patrol as a lead force in the management and regulation of traffic is well suited to exert its influence and expertise in this field. In doing so the Department must seize opportunities to expand its responsibilities in providing transportation services to the citizens of this State.

### **SITUATIONAL ANALYSIS**

The assessment of a situation in which a proposed change is to occur is crucial in the planning process. A panel of experienced members of the CHP conducted a two step situational analysis. The



panel included Deputy Chief Edward Gomez, Assistant Chief Richard Noonan, Lieutenant Dave Hahn, and Lieutenant Walter Baker. The first step was to examine the external environment, identifying opportunities and threats. An "opportunity" is a situation that is favorable to the proposed plan, while a "threat" is a situation that is unfavorable. A second assessment was made of the CHP's capability, including its internal strengths and weaknesses. A "strength" is a resource or capability the CHP can use to reach its objective. A "weakness" is a limitation or defect in the organization that would impede the attainment of its objective.

Using the S.T.E.E.P. (Social, Technological, Economic, Environmental, Political) model of analysis to complete this environmental overview, it was necessary to assess future trends and events in prior research before proceeding in the development of alternative strategies. Considered were both internal and external factors as well as the influences within the S.T.E.E.P. categories.

**Social** - The public is genuinely concerned with the pollution of the environment as a result of increasing traffic congestion. They are also concerned about incidences of highway violence, and traffic related injuries and deaths. As an issue of safety, motorists have armed themselves at an alarming rate for fear of being attacked or victimized.

One merely has to recall the last time that they were stuck in a traffic jam to appreciate the environment that many Californians must endure on a daily basis. Unfortunately, the prediction for the future is that traffic congestion will become even more of a problem than it is today. In the publication "Vision: California 2010," compiled by the California Economic Development Corporation, forecasters indicate that the state's population will continue to increase; predicting some 36 million people by the year 2010. Correspondingly, traffic congestion is growing five times faster than the capacity of the States highway systems. This results in poorer service, increased travel time, and higher out of pocket expenses that reduce productivity and deter businesses from locating or expanding in California.

The average commute time in California is currently about 45 minutes. By the turn of the century this figure could rise to two hours. If current trends continue, by 2010 the average speed during commute will be reduced from 35 mph to 19 mph.

There are a number of opportunities for law enforcement to provide higher levels of service in this category. For example, upgrading informational networks that provide real time information to the public so they can avoid areas of congestion, mass transit, and sophisticated traffic management centers. The only known threat is that congestion and its associated problems could get worse instead of better.

**Technological** - The technology currently exists to significantly improve the State's transportation systems and new technology is rapidly being developed. With the end of the cold war, the opportunity to redirect development of sophisticated weapons systems to transportation technologies is present.

In fact, traffic congestion has emerged as one of the most important issues of this decade and will continue to evolve through the 21st century. Implementation of new transportation technologies and development of efficient mass transit systems are the only means by which to alleviate the crowded conditions currently experienced by California motorists.

There are numerous opportunities that exist to assist in the development and implementation of new technologies; limited only by an organization's ability to engage in risk management. Threats to technology include special interest groups and lack of funds for both development and implementation.

**Economic** - Should predictions that traffic congestion will increase come true, and it is likely that they will, incidents of vehicle related violence, accidents, and congestion may increase significantly; placing further burdens on law enforcement to respond and mitigate the circumstance in order to restore normalcy. This occurring at a time when State and local governments are experiencing extreme

budget shortfalls. The climate now exists for the development and implementation of transportation technologies that will redefine traffic management as it is known today.

Unfortunately, forecasted trends indicate that budget shortfalls and dwindling resources are insurmountable obstacles affecting the implementation of emerging transportation technologies. Politics and special interest groups follow close behind. As a result, the lack of efficient mass transit will prolong the use of the personal vehicle as the preferred choice of travel in California. While the forecast is that additional personnel will be needed to provide traffic services, law enforcement must also be prepared to respond if the opposite becomes reality. For the California Highway Patrol, their position as a leader in transportation management is dependent on their effectiveness to monitor the progress of mass transit and developing transportation technologies, and on how well they predict the future. Even more important, is the CHP's ability to plan and respond to new challenges.

There are few if any opportunities for governmental agencies in this category. The trend forecast for the future predicts that there will be diminishing resources experienced by local and state entities into the 21st century. As a result implementation of transportation technologies will be delayed. However, there are number of opportunities evident for private companies. Not only those that are developing new technologies, but those entrepreneurs willing to venture into the public sector on a contractual basis. The major threat is that California will not be able to recover from its current economic slump. The defense and aircraft industries will continue to experience cutbacks and massive layoffs plunging California into further economic decline.

**Environmental** - In spite of strict standards placed on automobiles and industry to comply with clean air standards, traffic congestion is wreaking havoc on the environment. Air pollution is prevalent Nationwide and getting worse in most large metropolitan cities. Fossil fuel supplies are also being depleted, spurring development of alternate clean burning fuel technologies to slow pollution. If and when transportation systems and technologies

become commonplace, traffic congestion on California's streets and highways will become less severe. As an example, a marketing strategy to promote ride sharing in Los Angeles indicates that if a single person vehicle were to ride share just once a week, there would be one million fewer vehicles on the highways and that commuters would get to their destination in half the time.

It is also forecast that legislative mandates and strategies that promote mass transit, as well as implementation of new transportation technologies, will significantly reduce the number of vehicles using the State's highway systems. Considering all variables, the reduction of large number of vehicles should result in fewer officers required to provide traffic law enforcement, accident investigation, and other motorist services. Personnel assigned solely to these responsibilities may be redirected to other law enforcement priorities.

Opportunities exist to enhance air quality through the encouraged use of mass transit, involvement in the development and implementation of emerging transportation technologies, and the identification of alternative fuels. The greatest threat to the environment is that implementation of new transportation technologies will be temporarily or permanently delayed. Funding sources will be the major factor in this delay.

**Political** - Politically there are a number of opportunities for law enforcement administrators in researching and supporting the development and implementation of new technologies; especially for executives who are astute in political processes and recognized as leaders in the field.

The carnage and financial burden to society for traffic related incidents have collectively been somewhat ignored by some local jurisdictions. The Los Angeles Police Department has a uniformed strength of nearly 8,000 and a total budget of over 600 million dollars. Of this number, only 702 officers are specifically assigned to traffic responsibilities with a traffic program budget (Excluding personnel costs), of \$850,000. The Los Angeles County Sheriff's Department has approximately 7,700 uniformed personnel and a total budget that

exceeds \$1.2 billion. In their contract cities they have 1,005 personnel assigned solely to traffic responsibilities with a traffic budget excluding personnel costs of \$1.6 million. San Francisco Police Department has a uniformed strength of 1,850 personnel and a budget of \$180 million. Personnel assigned to traffic total 250. San Francisco has no specific budget for traffic as this function is program based.

Assuming that there will be no change in current traffic patterns, the opportunities to expand services for the management and regulation of traffic are endless. Traffic management is a law enforcement function that can be easily measured in terms of saving lives and reducing injuries and costs associated with property damage accidents. With legislative support, traffic is also a function that in many instances can generate enough revenue to sustain and make a traffic program self sufficient.

Finally, the motoring public is willing to consider almost any reasonable alternative to improve their driving safety and comfort. Law enforcement administrators should find considerable public support for programs or technology designed to relieve congestion, reduce highway violence, improve the environment, or reduce traffic deaths and injuries.

Unfortunately, the administrator who selects the wrong project to support may limit his/her career with the organization or administration. Sensitivity and reaction to the political climate often repress the decision making processes in the public sector. Another major threat are the special interest groups who will be attempting to exert their influence in implementing new technologies.

Opportunities in the field of mass transit and emerging transportation technologies are more prevalent than ever for law enforcement managers seeking to expand their sphere of responsibility. As an example, the newly implemented Metro Rail System in the Los Angeles area sent law enforcement officials scurrying to provide necessary law enforcement services. The lucrative contract was awarded to the Los Angeles County Sheriffs.

Threats associated with traffic management include decriminalization of traffic related offenses; thus eliminating this function as a law enforcement responsibility. The possibility also exists that emerging transportation and vehicle technologies will totally eliminate or significantly reduce traffic incidents requiring the presence of an officer. Agencies that have committed significant resources to this end, such as the California Highway Patrol, may have to redefine their goals and objectives in order to remain a recognized leader in the management and regulation of traffic.

However, the greatest threat impacting the implementation of new transportation technologies is the ability of State and local governments, as well as private industry, to finance new programs that will improve the States transportation networks. The forecasted trend is that California's economy will remain sluggish and its resources will continue to decline into the 21st century. While significant developments in the area of transportation technologies will exist there will be no money for implementation. If this occurs law enforcement will require additional personnel in order to keep pace with the demand for services instead of being able to redirect personnel to other priorities.

### **ORGANIZATIONAL CAPABILITY**

The capabilities of the California Highway Patrol to carry out its mission are challenged on a daily basis. A growing, dynamic society will further tax the CHP's organizational capabilities in the future. Rapidly emerging transportation technologies and development of mass transit systems present some unique opportunities for the CHP. To remain a recognized leader in the management and regulation of traffic, the CHP will have to expand its influence and venture into some non-traditional roles and responsibilities.

Emerging transportation technologies are designed to alleviate traffic congestion on California's heavily crowded roadway networks. Previous analysis indicates that the public is willing to support the implementation of these new technologies, if funding sources can be identified that do not overburden the taxpayer. Once implemented,

the new systems are expected to significantly reduce congestion as well as vehicle related incidents associated with overcrowding. Traffic accidents and resulting injuries and deaths are expected to become the exception rather than the rule, freeway violence caused by the stress of commuting will be eliminated, and the need to enforce traffic rules and regulations reduced significantly. As it stands, this will have a negative impact on current daily operational activities of the California Highway Patrol.

By virtue of its legal charter and mandate within the state, the California Highway Patrol possesses many inherent strengths in managing the state's transportation networks and is recognized as a leader in this field. This authority is further supported by statutes contained in the California Vehicle Code. As a statewide traffic law enforcement agency, the CHP is strategically situated to engage in and benefit in promoting the development and implementation of transportation technologies as well as mass transit.

The California Highway Patrol also has an ongoing procedure for reviewing and analyzing new transportation technologies and related legislation that will have an impact on its operation. As an organization the CHP is engaged in futures planning and enjoys a high degree of credibility and support from the state legislature. This is not to say that the CHP has blanket authorization to expand its roles and responsibilities in the management and regulation of the State's transportation systems.

In fact, the opposite is true. Special interest groups and local entities are powerful sources that have been successful in suppressing the CHP's desire to expand operations into other transportation or law enforcement related fields. An example is the recent metro rail system implemented in Los Angeles. The CHP was approached, along with other law enforcement agencies, to provide contractual law enforcement services and as a leader in the field of transportation the CHP was well suited to assume these responsibilities. Providing contractual services was inevitable until the Sheriffs Department exerted their political influence and was awarded the contract. Herein lies a major weakness in the CHP as an organization.

To remain a recognized leader in the field of traffic management into the 21st century, the CHP as a law enforcement agency will have to aggressively seek out additional responsibilities related to transportation. As mass transit expands across municipal and county boundaries, a state organization who has no jurisdictional restrictions is more suited to provide consistency of service. In fact, this was the nexus of the CHP when it was originally formed in 1929 and can be used as a strong argument for providing transportation services in the future. However, the CHP has been traditionally weak in fending off the political influence of the larger more powerful law enforcement agencies. The CHP as an organization will need to enhance their political influence if they are to overcome local domination in this arena. Politically this may be difficult to do. The Department's top administrators are appointed by and serve at the pleasure of the governor. If expansion is not supported as a major issue with the governor or the legislature, it is unlikely that any change will occur. Coupled with local interests exerting political influence, expansion of the CHP has little or no chance to succeed.

Weaknesses also include a constantly changing Governor and CHP Commissioner (potential every 4 years). With this change come new political philosophies and a new agenda. In essence, the CHP has to begin anew every four years, significantly delaying its ability to change as an organization. If the new administration does not embrace the change, expansion of the CHP will be difficult if not impossible to accomplish. The CHP's future as a leading law enforcement organization is uncertain if new transportation technologies designed to reduce congestion are implemented in a timely fashion.

### **STAKEHOLDER ANALYSIS**

The panel of CHP personnel assembled to conduct a situational analysis proceeded to the next phase of the process. To assess the impact that emerging transportation technologies will have on the effectiveness of the California Highway Patrol's strategic plan to maintain a leadership role in the implementation of transportation technologies and mass transit, one must consider potential



stakeholders. These stakeholders are people or organizations who will either be impacting strategic plan action steps, will have an impact on the plan, or are concerned about the issue in some way. Also to be identified among the stakeholders will be unanticipated entities (snail darters) who have potential of impacting the Department's strategies in an unexpected way.

Following is a list of perceived stakeholders and at least three assumptions held by that organization or individual. These stakeholders should be considered key components in any recommended implementation strategy. Listed next to the stakeholder is a projected stance towards the Highway Patrol's implementation strategies.

**Stakeholder #1 - State Legislature** (most probably supportive)

**Assumptions**

- a. Based on reputation of CHP will initially support expansion of CHP's traffic management role.
- b. May later defer support of expansion as a result of pressures from local government/special interest groups.
- c. Will resist additional funding or raising of taxes to expand CHP.

**Stakeholder #2 Public** - (supportive)

**Assumptions**

- a. Expect government to solve their transportation problems.
- b. Because of CHP's reputation as a leader in management and regulation of traffic, will support expansion of role.
- c. Will resist higher taxes to fund expansion.

- d. Will benefit from consistent, single agency law enforcement.

**Stakeholder #3 - Local Government** - (most probably supportive)

**Assumptions**

- a. Are concerned about rising costs of law enforcement services.
- b. Sensitive to desires of local agencies.
- c. Will want considerable input into quality of law enforcement services.

**Stakeholder #4 Governor** - (position of support unknown)

**Assumptions**

- a. Has own political agenda that may not coincide with CHP's.
- b. Will resist increasing state spending for additional services.
- c. Will be sensitive to local government desires.

**Stakeholder #5 - Allied Police Agencies** (most probably opposed)

**Assumptions**

- a. Will vehemently resist state agency performing law enforcement functions within their jurisdictions.
- b. Will oppose any legislation introduced to allow CHP to perform mass transit law enforcement functions.
- c. Will lobby aggressively in support of their own interests creating political infighting.

**Stakeholder #6 - California Peace Officers Association**

(position unknown)

**Assumptions**

- a. May perceive mass transit as an opportunity to expand local law enforcement influence.
- b. May see CHP's bid to expand as a move towards empire building.
- c. Have their own political agenda.

**Stakeholder #7 - Rapid Transit District** (most probably supportive)

**Assumptions**

- a. Would benefit economically by being absorbed into a large state agency.
- b. Would prefer to assume lead transportation agency role.
- c. Lack necessary authority to enforce laws across local boundaries.

**Stakeholder #8 - Federal Government** (most probably supportive)

**Assumptions**

- a. Will provide financial support to mass transit.
- b. Would support a single law enforcement agency in control of states transportation system.
- c. Politically, may not want to get involved.

**Stakeholder #9 - Anti tax Groups** (snail darter opposed)

**Assumptions**

- a. Will resist any increases in taxes to fund expansion of CHP.
- b. Are relentless and seldom compromise.
- c. Will attempt to influence source of funding.

**Stakeholder #10 - Automobile Manufacturers** (snail darter mostly opposed)

**Assumptions**

- a. Stand to gain financially if mass transit is delayed.
- b. Will lobby legislative contacts to slow implementation of mass transit.
- c. Have vested interest in maintaining status quo.

**Stakeholder #11 - C.A.H.P - Union** (supportive)

**Assumptions**

- a. Will support expansion of CHP responsibilities.
- b. Will lobby aggressively for legislative approval.
- c. Will want to be a major player in setting terms and conditions of new work responsibilities.

**Stakeholder #12 - Environmentalists** (supportive)

**Assumptions**

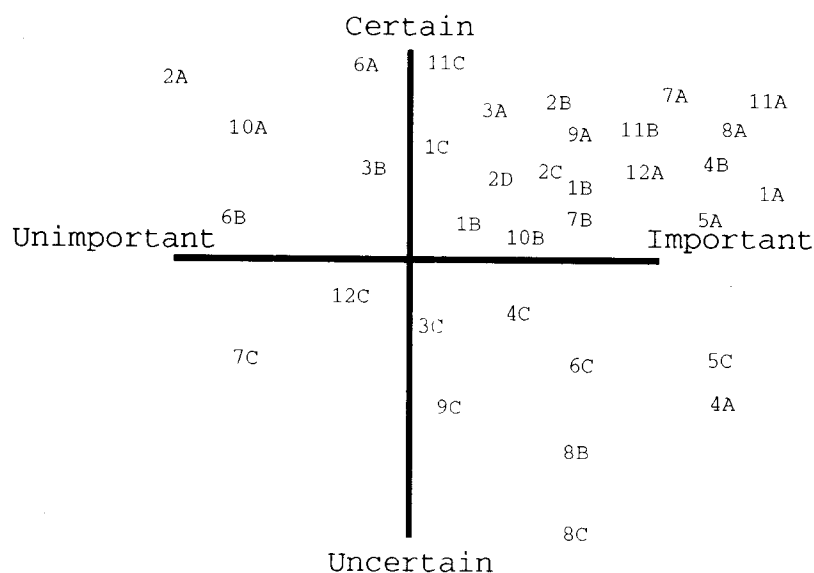
- a. Will support rapid movement to implement mass transit and other transportation technologies.

- b. Will work towards reducing congestion on all transportation networks.
- c. Will support safe, efficient, use of all transportation systems.

To further appreciate the importance and certainty of these assumptions versus their opposite positions of uncertainty and lack of importance, the assumptions have been plotted on a mapping grid Table 26.

Table 26

### ASSUMPTION MAPPING



### LEGEND

#### STAKEHOLDERS:

- |                           |                              |
|---------------------------|------------------------------|
| 1. State Legislature      | 7. Rapid Transit District    |
| 2. Public                 | 8. Federal Government        |
| 3. Local Government       | 9. Anti-Tax Groups           |
| 4. Governor               | 10. Automobile Manufacturers |
| 5. Allied Police Agencies | 11. C.A.H.P. Union           |
| 6. C.P.O.A.               | 12. Environmentalists        |

The positions have been plotted based on the most recent review of social, technological, environmental, economic, and political trends

and events. Although they are subjective in nature, the positions have been plotted on the graph based on perceived value to the individual stakeholders.

### **Alternative Strategies**

Achievement of the California Highway Patrol's mission, goals, and objectives is based primarily on strategies developed for that purpose. In identifying and formulating a strategy to ensure that a future leadership role exists for the California Highway Patrol in the management and regulation of the State's transportation networks, a forecasting process known as the "Modified Policy Delphi" was used.

The primary objective of the Modified Policy Delphi process is to insure that a variety of alternative strategies, designed to address the strategic issue, are identified and explored. The panel was given the previously prepared mission statement and asked to generate a list of strategy alternatives that would help the CHP attain this mission. Each potential strategy was rated on its feasibility, desirability, and stakeholder support. Through a rating process, the panel narrowed the strategies to three.

The three most realistic strategies that were ultimately chosen are as follows. Two of the selections were perceived by the panel to be too narrow. Strategy #2 was determined to be the most divergent and provided the greatest number of opportunities for new organizational responsibilities.

1.    **The California Highway Patrol will continue its current philosophies and seek additional personnel to keep pace with an increasing demand for traffic services.**
2.    **Under the concept of regionalization, the California Highway Patrol will explore opportunities for consolidation of law enforcement services.**

**3. The California Highway Patrol will explore and seek out opportunities that will enhance its leadership role in the field of traffic management and mass transit law enforcement responsibilities.**

A discussion was held regarding the pros and cons, arguments for and against, these three alternatives. Strategy #2 remained the highest rated, and the preferred choice of the panel. However, after further discussion it was decided that strategy #2 was too optimistic. Although the strategy incorporates the assumption of mass transit authority, when coupled with consolidation of all state law enforcement services the chance of this occurring within the next ten years is extremely remote. Therefore, the panel agreed that it was more realistic to begin with strategy #3 "The California Highway Patrol will explore and seek out opportunities that will enhance its leadership role in the field of traffic management and mass transit law enforcement responsibilities". However, strategy #2, to achieve status as a full service law enforcement agency, should continue to be the ultimate goal of the organization.

Several assumptions that are inherent in enhancing the role of the CHP in traffic management and mass transit law enforcement responsibilities must initially be considered before any strategy can be finalized.

First, is that all future forecasts predict that traffic congestion will continue to get worse on all state roadways. Accidents, injuries, deaths, and vehicle related violence will continue to challenge law enforcement capabilities. Law enforcement will be unable to cope with the demand for services without augmenting existing personnel. Continuing fiscal constraints will limit law enforcement ability to increase personnel.

Second, the development of technology involving vehicles and highways is increasing very rapidly. It is expected that California's defense oriented industries will redirect their research and

development efforts away from military applications towards transportation related problems. As a result, technology in this field

will be developed at an even faster pace. Private entities would not invest millions of dollars in research and development if their product will not be marketable. Therefore, it is expected that the technology will work as designed and that it will have a significant impact in relieving traffic congestion on the state's highway systems. As an example, if traffic congestion and related problems are decreased 50%, it stands to reason that there would be a corresponding decrease in the need to provide traffic services.

The third assumption is that the California Highway Patrol cannot maintain its position as a recognized leader in the field of traffic management or expand its influence in mass transit law enforcement responsibilities without the support of the governor, the legislature, affected allied agencies, local entities, and the public. Funding, definition of roles and responsibilities, and legislation are major issues that will have to be addressed. As a result, successful evolution and realization of enhanced leadership in this field will not be fully realized until well into the next century.

In establishing the California Highway Patrol in its logical role as the primary agency for law enforcement of all State transportation networks, an analysis of the three most popular strategies must be considered as well as stakeholder perceptions of each.

The first strategy suggested that the California Highway Patrol will continue with its current philosophies and seek additional personnel to keep pace with the increasing demand for traffic services. Unfortunately, in an era of resource scarcity, any expansion effort will be met with stiff opposition. As an organization, the CHP has traditionally accepted greater responsibilities without obtaining the necessary resources to efficiently manage new programs. Doing more with less has become a familiar term within the organization. The financial situation of the state has further exacerbated this problem. While the demand for services continues to rise, the CHP's personnel resources have declined. As a result, the level of service the public



has come to expect has been negatively impacted. In fact, an independent study revealed that the CHP needs at least 2,000

additional officers to meet minimum staffing levels within the state. Needless to say, the lack of state revenues that are forecasted to continue through at least 1995, severely limit any potential for growth. If future forecasts that traffic congestion will increase are accurate, the CHP will not be able to provide anywhere near the level of service to the public currently provided. It is almost certain that the public would support expansion of the CHP, but the degree of support would be dependent on associated costs. Anti tax groups would oppose any increases in taxes or vehicle registration fees to fund additional personnel.

There is no advantage for the Department to continue on this path. As an organization the CHP must look towards the future and not remain entrenched in past tradition; especially, if new transportation technologies are implemented in a timely fashion and traffic congestion is reduced significantly as a result of these new technologies. Stakeholders such as the governor, legislature, local entities and allied law enforcement agencies, need to be informed on evolving problems facing the CHP as a transportation management organization. The Department will also need to enlist support of these groups to adequately respond to a constantly changing society.

The second strategy is for the California Highway Patrol, under the concept of regionalization, to explore opportunities for consolidation of all state law enforcement services. Again, looking towards the future, it is forecast that government services will become regionalized to prevent duplication of effort and more efficiently provide services. In exploring this concept, probable recommendations would be to incorporate the California Highway Patrol, California State Police, Department of Justice, and enforcement sections of the Parks and Recreation Department and the Department of Fish and Game, into a single law enforcement agency.

The pros for consolidating state law enforcement services include a more informed, economical, effective and professional state

police agency, that is better suited to provide service to the citizens of the State of California. The greatest stakeholder in this strategy will

realistically be the California Highway Patrol. As an organization, the CHP would stand to gain numerous opportunities in expanding non-traditional roles and responsibilities in law enforcement. In contrast, the other agencies involved in this strategy would vehemently oppose any consolidation efforts; even if favorable documentation was to be presented supporting this concept. Each agency and employee union would be expected to band together and aggressively lobby their special interest groups and legislators in order to maintain their identities as an organization.

Other key players in this strategy are the governor and the legislature. Without their support, this strategy has little possibility of becoming reality. In this political arena is where the waters will have to be tested to determine support or non support. Consolidation efforts must begin here.

This strategy also includes the elements of strategy #3 that indicates the CHP should explore opportunities to expand its leadership role in the field of transportation. Strategy #2 however is all encompassing. The CHP should continue to look further into the future and aggressively seek out some of the more non traditional roles and responsibilities not previously available to the organization as a law enforcement agency. Because a higher level of service at a more economical cost will be provided as a result of regionalization, the public is expected to support the consolidation. In this concept anti tax groups, originally believed to be a snail darter, would also be supportive due to the considerable savings realized--this at a time when every dollar counts.

Even more importantly would be the effectiveness of a single agency in the ability to share communications capabilities and law enforcement related information. For example, there are approximately 38 different law enforcement entities within Los Angeles County. Each agency has their own priorities. When a crime is committed in Downey Police Department's jurisdiction, seldomly is

that crime reported to or is information exchanged with any of the other law enforcement agencies; unless it is a high profile major crime.

This hampers the ability of law enforcement to effectively address rising incidences of crime. Imagine a single law enforcement agency with an efficient communications system sharing information on a timely basis and the positive impact on an agency's ability to identify and arrest members of the criminal element.

It is believed that local entities will neither oppose nor support the consolidation of state law enforcement functions. However, they are expected to oppose the CHP in the assumption of transportation related law enforcement responsibilities unless local entities have input into the types and levels of service to be provided. While auto manufacturers have been categorized as a snail darter, in strategy #2 they appear to have no perceived influence. For the most part, auto manufacturers will be supportive of new transportation technologies, especially if they are integrated into vehicle systems.

The federal government is not expected to oppose nor support the consolidation of state police services. Most likely they will view this as a state issue. It is also believed that they will support a single agency concept to provide law enforcement services for mass transit on the basis of effectiveness and consistency.

Finally, there should be some thought as to the method of selection for the top administrator of the CHP. Currently the Commissioner is appointed by and serves at the pleasure of the governor; with the concurrence of the legislature. This selection process is somewhat at odds with government's separation of powers. Theoretically, law enforcement is a function that is more closely aligned with the judiciary branch of government and requires some autonomy in carrying out its responsibilities. Unfortunately, at times an appointed official is influenced by the appointing power and acts in accordance with his/her wishes. Law enforcement should be responsive to the people. Therefore, who better to select the top official than the public whom they serve. If the top administrator does not perform, then it will be the people who have the opportunity

to vote the individual out of office. An elected Commissioner would be independent of the governor and not subject to undue political influence in enforcing the laws of the State. The Commissioner would also be able to develop and implement programs within the CHP that benefit the organization and provide more effective and efficient law enforcement. In short, it significantly limits the role politics play in the management of law enforcement. An elected official has a degree of insularity from unreasonable demand by any superior and answers only to the voters.

The third strategy was for the California Highway Patrol to explore and seek out opportunities that would enhance the organizations leadership role in the field of traffic management and mass transit. The assumption of mass transit law enforcement responsibilities within the state is but one aspect of this strategy. On the pro side of this strategy, the CHP by expanding its role to include this responsibility, would guarantee its leadership role as an influential force in the management and regulation of traffic well into the 21st century. Mass transit as well as other emerging transportation technologies is considered the primary means by which to effectively reduce the increasing traffic congestion on California transportation networks. The California Highway Patrol as a statewide law enforcement agency is well suited to assume State mass transit regulatory responsibilities. In fact, the impetus as to why the CHP was formed in 1929 was to provide for the uniform and consistent enforcement of vehicle related laws throughout the state. As mass transit evolves and transcends across local boundaries, this consistency may be lost if current methods of providing services are continued. As an example, there has been considerable in-fighting between law enforcement agencies in the Los Angeles area as to who was going to provide law enforcement services on the new metro rail system. The system is expanding into Orange, Riverside, and San Bernardino counties. Each jurisdiction wants to provide law enforcement services within their respective counties and do not want any other agency to intrude on what is perceived as their responsibility. Will services provided by one of these organizations conclude at the county line and the other agency begin where the other left off? This idea is somewhat absurd and does not lend itself

to professional, consistent law enforcement. On the other hand, the CHP is not bound by local jurisdictional boundaries and there is no other law enforcement agency in the state that has the knowledge and experience of the CHP in managing and regulating traffic. As mass transit expands throughout the state it stands to reason that a single state agency would be more effective in providing necessary law enforcement services.

There are a number of stakeholders that would oppose any movement by the CHP to assume mass transit law enforcement responsibilities. Local law enforcement agencies lead the pack; each wanting to exert their own special interests for opportunities to expand law enforcement services. The rapid transit police district in Los Angeles would also like to expand their role in transportation and assume mass transit law enforcement; perhaps the initial step in creating a new statewide mass transit police organization as their goal.

The political climate is another area of major concern. The agenda and support of the governor, the legislature and local entities are very difficult to predict. Considerable lobbying will have to be done in order to obtain their support. As experienced in the past, any proposal to expand the responsibilities of the CHP without their support will result in this strategy dying a very quick and sure death.

Auto manufacturers have been categorized as a snaildarter and may exert some influence to delay implementation of mass transit. Delaying mass transit will result in enormous profits for auto makers.

The federal government provides the states with millions of dollars in transportation funds and may have a vested interest in how law enforcement services will be provided on the State's mass transportation systems.

While this strategy is a step forward in enhancing the responsibilities of the CHP, it is still considered somewhat narrow in scope and somewhat limits the opportunities and capabilities of the CHP as an organization. For that reason, the panel recommended that

the CHP continue to remain alert for opportunities to implement strategy #2.

Implementation of strategy #3 will be long and tedious. Opposition, expected to be strong at times from local entities, will be at every corner. It will be left to CHP's executive management and state politicians to negotiate reasonable solutions to this opposition. If successful, the opportunities for the California Highway Patrol in the management and regulation of mass transit are endless. Not only will the CHP benefit as an organization, but so will the citizens of the State of California by receiving consistent, professional, law enforcement services on the State's mass transit systems.

### IMPLEMENTATION PLAN

For a strategy to be successful, an implementation plan must be properly formulated. The specific steps involved in the implementation of this strategy are listed below, followed by an estimated time for implementation.

- The commissioner appoints a project manager to initiate a study to develop a plan for the assumption of statewide transportation related law enforcement responsibilities----one month.
- The project manager appoints a task force to analyze and review all State transportation systems----one year.
- The project manager directs the office of special projects to prepare a 7 year plan to assume all State transportation law enforcement responsibilities----one year.
- The project manager directs the office of special representative to form a legislative committee to research, write and propose legislation, and solicit support from the legislature----one month/on-going.

- The project manager assigns a liaison to inform and lobby local government/law enforcement for their support----one month/on-going.
- Monitor progress of plans/decision for desired results----monthly/on-going.

One person should be appointed the project manager. This individual will oversee the entire process and make sure the program runs smoothly and that the various tasks are accomplished. The project coordinator should be someone who is in a position of decision making authority, at the rank of Assistant Commissioner. He or she must be willing to do the job and have an interest in expanding the CHP's role into transportation related law enforcement responsibilities. This person will also direct other units to accomplish specific tasks related to their expertise and ability to get the job done.

The task force will have the responsibility to review and analyze existing transportation agencies and develop recommendations. The task force will be comprised of both field and staff personnel with specific interest and expertise in the field of transportation. Specific guidelines for accomplishing the goals and objectives of assuming transportation related law enforcement responsibilities will need to be formulated and provided to task force members in written form. A charge of the task force will be to recommend policy to perform the new responsibilities as well as the logistics required for implementation. The task force will act as a resource for the office of special projects.

The office of special projects will be responsible for researching the issues and developing a comprehensive plan for implementation. The plan will include funding, policy, personnel and other logistical recommendations. The project team will also work closely with the task force to incorporate pertinent recommendations. Due to the complexity of the issue, implementation will occur in increments over a seven year period.

The office of special representative will form a committee to research appropriate legislation impacting the assumption of transportation related law enforcement responsibilities. If needed, they will also draft the appropriate legislation to transfer these responsibilities to the State. Legislation funding the new responsibilities will be of prime concern. Finally, it will be the task of the committee to lobby the legislature for the support needed to enact the legislation necessary to accomplish the mission to assume law enforcement responsibilities on all public transportation networks.

The office of public affairs will appoint a liaison to provide information to local government and local law enforcement. The purpose of the liaison is two-fold. First to answer pertinent questions regarding the proposal, and second to solicit support.

The next step is to monitor the progress of the plans and decisions to determine if the desired results have been obtained. Should the results be less than desired, appropriate clarification, modification, and direction should be initiated that will help attain the desired results.

### NEGOTIATING ACCEPTANCE OF THE STRATEGY

For a successful implementation of the strategic plan, it is necessary that the stakeholders support and accept not only the policy, but the course of action in the planning phase. This is accomplished through a negotiating process. Participation of the stakeholders in the development of policy and the resulting stakeholder ownership are key ingredients vital to the success of the strategy. Therefore, they are non-negotiable in accomplishing the mission. When dealing with a highly controversial issue, such as assuming State transportation law enforcement responsibilities, it is essential that all parties have complete "buy-in" to the process, or the process is likely to fail.

However, there are components of this strategy which are of lesser importance and are negotiable for the sake of accomplishing the mission. For example, there are a number of personnel issues that will



undoubtedly arise in assuming transportation law enforcement responsibilities from agencies that currently provide these services-- Bay Area Rapid Transit District (BART), Orange County Transit(OCTD), Los Angeles County Metro Transit Authority (LACMTA) etc. State benefits which may or may not be an issue as well as rank structure within the new organization although important can be worked out to accomplish the greater mission of providing better service to the public.

In order to successfully negotiate the alternative proposed, each stakeholder must be anticipated in the negotiating strategy. The most desirable strategy is one in which all parties receive a mutual gain from participating in the process. The proponents of the strategy should move forward with a plan to employ a "win-win" negotiation strategy, or at least an effort to gain compromise with stakeholders. This is the best approach since the primary stakeholders involve the general public and employees of various organizations to be incorporated into the CHP organization.

However, some stakeholders do not enjoy a feeling of mutual trust. For them the use of a win-lose approach may be necessary when dealing with critical components of the strategy.

### TRANSITION MANAGEMENT PLAN

This portion of the paper presents a "Transition Management Plan" for implementation of a proposal for the California Highway Patrol to seek out and expand its leadership role in the field of transportation management by assuming regulatory responsibility for law enforcement services on Public transportation networks.

As previously stated it is believed that emerging transportation technologies and strategies that reduce traffic congestion will significantly impact the manner in which law enforcement manages traffic in the future. As mass transit becomes more attractive as a plausible means of transportation, and as new technologies involving vehicles and highways are implemented, fewer law enforcement services to facilitate the flow of traffic on the State's transportation

networks will be required. This will provide law enforcement agencies an opportunity to redirect personnel resources assigned to traffic responsibilities to other priorities. Being task specific, the California Highway Patrol will have to expand their responsibilities in order to maintain their role as a leading influence in the management and regulation of traffic within California.

In the strategic plan, three strategies were formulated and examined. These strategies were:

- The California Highway Patrol will continue with its current philosophies and seek additional personnel to keep pace with the increasing demand for traffic services.
- Under the concept of regionalization, the California Highway Patrol will explore opportunities for consolidation of State law enforcement services.
- The California Highway Patrol will explore the feasibility of assuming mass transit law enforcement responsibilities.

The second strategy was selected as the most desirable on the basis of being the most divergent and providing the CHP with the greatest number of opportunities for new organizational development. However, this strategy is overly optimistic and although it may someday become reality it is too much to accomplish in a ten year span. Therefore, strategy #3 was selected as a more realistic possibility for seeking out new opportunities. This strategy also coincides with futures forecasting that indicates State government must consolidate services and streamline departments to promote efficiency and reduce the duplication of effort. By consolidating transportation related law enforcement services, the public will benefit through enhanced communication, consistency, efficiency, and cost effectiveness.

Strategy three encompasses the exploration of the CHP assuming Statewide transportation related law enforcement responsibilities. By the end of the decade it is expected that rapid transit will play a

significant role in defining California's mode of travel. It is also a new field within law enforcement; one that presents endless opportunities for a proactive law enforcement agency with a vision towards the future. Because of their many years of experience in managing the State's transportation networks, as well as their Statewide jurisdiction, the CHP is the most logical agency to provide the consistency needed for effective law enforcement and should assume Statewide rapid transit law enforcement responsibilities.

Unfortunately there are a number of major obstacles to overcome in allowing the CHP to expand their role in transportation management. First and foremost is to overcome the tradition in which the organization is entrenched. Second is to inform and gain the support of those in a position within the organization who will take the necessary positive steps to influence the future direction of the Department. Third is to gain the support of the Governor and legislature. They are the ones who will ultimately provide the funding and legislation necessary to enact the proposed changes within the organization. Inaction may result in the CHP experiencing significant reductions in personnel, loss of responsibility and partial or total obsolescence.

In the strategic plan, 12 stakeholders were identified as being key persons/groups that must be dealt with prior to or during the negotiating process. These persons/groups must be aggressively and proactively challenged if the selected strategy is going to succeed in the transition management phase. The goal of this transition plan is to facilitate moving from the present to the desired future. To this end, this researcher will address the key components needed to effect a smooth transition to manage the proposed strategy plan, i.e, the critical mass, management structures, intervention technologies and strategies, and commitment.

Although the transition plan has been narrowed in its focus to address how emerging transportation technologies will impact traffic management within the California Highway Patrol, the processes can be used by all law enforcement agencies to assess future transportation management needs.

## CRITICAL MASS ANALYSIS

In order to identify the critical mass it is necessary to further examine the stakeholders and snaildarters. The critical mass is the minimum number of individuals or groups whose support is essential to the success of the strategic plan. Once identified, the commitment level of each actor must be analyzed in terms of block change, let change happen, help change happen, or make change happen. This is essential in identifying those individuals or groups who must be targeted and lobbied in order to move their commitment level to a position which supports the proposed change.

In evaluating the strategic plan to determine the impact of emerging transportation technologies on the future of the California Highway Patrol as a leading law enforcement agency, the following eight critical mass actors were identified:

- *COMMISSIONER*
- *CHP EXECUTIVE MANAGEMENT*
- *SECRETARY OF BUSINESS AND TRANSPORTATION AGENCY*
- *STATE LEGISLATURE-(INCLUDES GOVERNOR)*
- *LOCAL GOVERNMENT*
- *CALIFORNIA PEACE OFFICERS ASSOCIATION*
- *CALIFORNIA ASSOCIATION OF HIGHWAY PATROLMEN*
- *PUBLIC*

To provide an even more graphic illustration of the commitment level of those identified as actors in the critical mass a "Commitment

Chart" was constructed (Table 27). The chart uses and "X" to plot the current level of commitment while an "O" illustrates the desired level needed to effect the desired change. Arrows are used to signify the direction an individual or group must be moved in order to gain the necessary commitment for the success of the transition plan.

Table 27

### COMMITMENT CHART

<b>Critical Mass Individuals/Groups</b>	<b>Block Change</b>	<b>Let Change Occur</b>	<b>Help Change Occur</b>	<b>Make Change Happen</b>
Commissioner			X----->	O
CHP Executive Management		X----->		O
Secretary-Business and Transportation		X----->		O
State Legislature/ Governor		X----->		O
Local Government	X----->			O
California Peace Officer Association	X----->			O
California Association of Highway Patrolman			X----->	O
Public			X----->	O

X = Current Level of Commitment  
O = Desired Level of Commitment

From the commitment chart one can see the movement that must take place in order to achieve the necessary commitments to enact the proposed changes. The following is a detailed analysis of these positions:

**COMMISSIONER** - Has been pro-active in recognizing the need to expand the responsibilities of the California Highway Patrol in transportation related fields. He has also been in the forefront of advocating consolidation of State law enforcement services. In fact, both present and past Commissioners have initiated studies which strongly support this concept.

The Commissioner is adept at being sensitive to the political climate. Current and past practices also indicate that he is a leader in the risk taking required to better the Department. However, because he serves at the pleasure of the Governor, he must remain guarded in his recommendations until the time is right to introduce what will certainly be considered as radical and non-traditional organizational changes. This is also the nexus for the Commissioner being listed on the commitment chart as helping change happen. Once he perceives that the time is right for a successful transition, it is expected that he will automatically move into the make change happen category. He will then vigorously promote the changes necessary to expand the CHP's responsibilities. The Commissioner will also play a critical role in convincing the Secretary of the Business and Transportation Agency, the Legislature, and the Governor that the assumption of mass transit law enforcement services is in the best interests of the citizens of the State of California.

Unfortunately, the Commissioner will not be without opposition in his efforts to enact proposed changes. Local government as well as the California Peace Officers' Association will view the CHP's proposals to expand as threatening; irrespective of factual data supporting the benefits of consolidation. Under the current structure, as first Vice President of the California Peace Officers' Association, the Commissioner will ultimately be elevated to serve as President. During this time he will have the greatest opportunity to influence the Peace Officers' Association to support the CHP's expansion efforts. He will also be in a position to provide assurance that the CHP is not seeking to challenge or assume local law enforcement responsibilities.

The remaining actors will be expected to either let change happen or play a reduced role in helping the proposed changes occur.

In his role to make change, happen, the Commissioner will need to utilize the services and contacts of these actors to positively impact the transition plan; especially if he is going to gain the support of those actors who may be less than receptive to a proposed assumption of transportation related law enforcement responsibilities.

**EXECUTIVE MANAGEMENT** - of the Department is comprised of eight field Division Chiefs, four Headquarters Chiefs, two Assistant Commissioners, and a Deputy Commissioner. This group readily recognizes the need for the CHP to expand their responsibilities and will strongly support efforts to branch out into other areas of transit related responsibilities. They are also well aware of the benefits and opportunities in consolidating State law enforcement services, both to the public as well as the Department. In their respective geographical locations, each Chief will need to influence their allied law enforcement agencies that have transit related responsibilities and their local governments to move from a position of block change to a position that will allow change to occur.

Division Commanders are also expected to play an integral role in assessing legislative support and in advising the Commissioner when it is politically favorable to move forward with the plan. In order to solicit favorable support for the proposed changes, it is critical that each Chief make as many presentations as possible and answer inquiries that justify the expansion. A Commander's direct involvement will be the key ingredient in overcoming local government's fear that they will lose control of transportation related law enforcement responsibilities within their communities should any consolidation occur.

**SECRETARY OF BUSINESS AND TRANSPORTATION AGENCY-**  
as the Governor's overseer of the California Highway Patrol, he must

be convinced of the benefits of consolidating transportation related state law enforcement services in both terms of efficiency and cost effectiveness. While it is difficult to predict his position of support, for now, he must merely let change happen. However, as the proposal develops and it is shown that the consolidation will result in significant savings, it is believed that the Secretary will strongly support the plan.

As the intermediary between the Governor and the CHP, the Secretary will need to support the proposal before it can be presented to the Governor or Legislature. Lacking this support, it would be

extremely difficult to move forward. Therefore, it will be necessary for the Commissioner to convince the Secretary of the merits of the plan. This should not be a difficult task in an era of fiscal constraint within State government. At this point, the Secretary must move to a position to help change happen. The only opposition foreseen will come from those agency heads that may find their positions eliminated as a result of consolidation.

STATE LEGISLATURE / GOVERNOR - are listed together because they are both perceived to be in a position of let change happen at this time. The State is in the midst of a severe fiscal crisis; with no relief in sight. In fact, in the futures forecasting section of this research, the fiscal crisis was predicted to continue for at least the next ten years. Also predicted is that State government will need to consolidate services in order to become more efficient and cost effective. In keeping with this position, the Governor and Legislature will have no alternative but to consider the proposal. To ignore the CHP's plan for expansion into mass transit and consolidation of services may be politically unpopular at a time when every penny must be strictly accounted for.

The expansion and consolidation plan will need to be carefully thought out and address all of the key elements. And in order to survive, the plan will have to be more than just fiscally sound. It



must be sensitive to the placement of other Department heads, their staffs and employees. It will be the Commissioner's responsibility to ensure that the plan addresses each and every concern as well as present it to the Governor. Once the Governor is convinced of the merits of the plan, he must then move from his position of let change happen to a position of help change happen. The Governor can begin his movement by appearing before the Legislature alongside the Commissioner to present the proposal. Together they must convince the Legislature that expansion of the CHP into other transportation related fields is both efficient and cost effective. When the Legislature buys into the proposal, they too will then move from a position of let change happen to help change happen.

Even though the plan to assume transportation related law enforcement responsibilities is sound and makes sense, there is still anticipated opposition. It is expected that local government, which includes law enforcement, and other related special interest groups, will vehemently oppose any form of State law enforcement consolidation. They believe that any attempt to create a single State law enforcement agency with transportation enforcement responsibilities will infringe upon local governments right to govern.

Furthermore, law enforcement agencies perceive that they will lose authority and responsibility; thus will be threatened by the CHP 's attempt to expand. Local government will ask the assistance of the California Peace Officers' Association in opposing the CHP's proposals.

In responding to these fears, the Commissioner, CHP executive management, the Governor, and the Legislature, must successfully assure local government that the CHP is not seeking to challenge or assume local law enforcement responsibilities. It is also critical that local government be restrained from lobbying state representatives to sway" a previous position of support for CHP expansion. This restraint will be fostered through communication and understanding of the planned proposals.

**CALIFORNIA PEACE OFFICERS ASSOCIATION** - is a powerful association with the majority of its members comprised of local police and sheriffs. It is anticipated that for reasons already stated they will attempt to block change to allow the CHP to expand their law enforcement role. They will also oppose any attempts to consolidate State law enforcement services. As a member of the Association, the CHP must convince the board that consolidation is in the best interest of the State and that any expansion of the CHP will not infringe upon local law enforcement responsibilities. Success in moving the Association to a position of let change happen would accelerate the CHP's ability to move forward with their proposal.

The Commissioner will soon be in a position to positively influence the membership in this endeavor. As first Vice President of the Peace Officers' Association, he will soon be elevated to President. Once this occurs he can present the proposal in such a manner that alleviates the perception of fear. At least the Association will have to listen to the proposal before voting on a position of support. The Commissioner will also have the opportunity to lobby individuals to gain their support.

**CALIFORNIA ASSOCIATION OF HIGHWAY PATROLMEN** - is a powerful employee organization representing the rank and file members of the CHP. They are well versed in lobbying techniques and enjoy a highly favorable relationship with members of the Legislature. The Association will need to be brought on board immediately and any labor/management concerns that may arise must be addressed in a timely manner. A major concern is how the CAHP will fit into the planned consolidation as an employee union. Any real or perceived reduction in status will be met with stiff opposition. This is the same obstacle that must be overcome with the other employee unions, who in all probability will face at least some consolidation. Regardless of the concerns, the Association recognizes the potential for the CHP in expanding their law enforcement role. As a result, the Association will strongly support consolidation efforts. It will be essential for the CAHP to take a lead role in developing a plan that provides for an equitable settlement for placement of union employees. It is primarily for this reason that the Association is listed as help change

happen. However, it is critical that the Association maintain this position throughout the transition phase. Should any major obstacles occur, the Association is also in a position to temporarily move into the make change happen category by exerting their influence with the Legislature.

**PUBLIC** - The public is currently analyzed as let change happen. As long as they remain in this category they are not an obstacle in implementing the CHP's transition plan. The public will benefit the most by expanding CHP responsibilities into mass transit and in consolidating transportation related law enforcement services. The consolidation will ensure more efficient and cost effective law enforcement services at a time when the level of services has been steadily declining. Consistency of services will also be a major selling point. For this reason the public may be swayed to play a greater role in implementing the transition plan. Should the transition plan appear to be headed for failure in the Legislature, the Commissioner, Executive Management, and the California Association of Highway Patrolmen can appeal to the public to exert the pressure needed to ensure passage. The reputation of the CHP will play an important role in accomplishing this task. Going behind the back of the Governor and Legislature may also be viewed as politically insensitive. Nonetheless, it remains a viable option if required.

### TRANSITION MANAGEMENT STRUCTURE

The management structure to be employed during the transition phase must place Executive Management responsibilities on the Commissioner. It must be a structure that helps the California Highway Patrol manage the transition from its limited traffic law enforcement role to the desired state of total transportation related law enforcement authority and full State law enforcement responsibilities. The initial management structure will differ somewhat from the ultimate future structure. The Commissioner will act as project manager and will be in charge of details of the program.

He will assume the leadership role necessary to gain the partnership arrangement between the Secretary of the Business and Transportation Agency, the Governor and the Legislature.

Additionally, a subcommittee needs to be formed that will be led by the Deputy Commissioner. Although the Commissioner is in the leadership role, the Deputy Commissioner as second in command will serve in the manager role. The committee will be tasked with identifying the goals and objectives, establishing a time line, providing the initial resources to bring the various stakeholders together, and gaining commitment from the critical mass players.

The Commissioner would provide the political base while the Deputy Commissioner would use a "diagonal slice" of representation for his meetings. This method entails getting representatives from

various levels and groups, both internal and external, compared to representation by their formal leaders. It will also allow input from the organizations that will be impacted by the consolidation plan.

This method will be used in the initial management structure by utilizing the critical mass actors as the diagonal slice. The goal is to bring these individuals together to obtain input, ideas, requests, and concerns to service as a foundation for working out the intricacies of the proposal and obtain commitment. An equally important goal is to develop a candid dialogue; one that creates an atmosphere of mutual trust and cooperation.

Early in the proposal, the Commissioner and Deputy Commissioner should use a responsibility chart to clarify role relationships as a means of focusing on the tasks at hand, reducing ambiguity and adverse emotional reactions (Table 28). The chart will be used to identify and hold accountable those individuals who have been assigned critical roles in bringing about the proposed change.

Table 28

## RESPONSIBILITY CHART

DECISION/TASK	COMMISSIONER	EXECUTIVE MANAGEMENT	SECRETARY-BUSINESS AND TRANSPORTATION AGENCY	STATE LEGISLATURE/GOVERNOR	LOCAL GOVERNMENT	CALIFORNIA PEACE OFFICERS ASSOCIATION	CALIFORNIA ASSOCIATION OF HIGHWAY PATROLMAN	PUBLIC
Evaluate Existing Organizational Structure	A	R	S	S	S	S	S	I
Develop Plan	A	R	A	S	S	S	A	-
Gain Internal/External Support	R	R	R	I	S	S	R	I
Present to Governor/ Legislature	R	S	A	-	-	S	-	-
Implementation	R	S	R	I	I	I	R	I
Monitoring	S	S	R	S	S	S	R	S
Evaluation	S	S	R	S	S	S	R	S
Future Recommendations for Enhancements	S	S	R	S	S	S	R	S
Future Recommendations for Enhancements	A	A	R	S	S	S	A	I

### LEGEND

R = Responsibility (Not necessary authority)    I = Inform    - = Irrelevant to this item  
A = Approval (right to veto)    S = Support

### IMPLEMENTATION TECHNOLOGIES AND METHODS

An extremely important element to successful implementation of any new concept or program is the reduction of anxiety and uncertainty during the transition period. The proposal to consolidate State transportation related law enforcement services is highly

controversial with numerous apparent special interests. Although politics in implementing this proposal will be a key issue, they will not be insurmountable. Communications and flexibility throughout the transition management plan is paramount. The technologies/methods which will help mitigate negatives and enhance commitment are:

**Communication of the proposal** - Consolidation of transportation related law enforcement services entails the monumental task of bringing together organizational structures of several public agencies currently charged with providing these services. Acceptance of the proposal for consolidation is a key factor in bringing about the desired change. The rank and file as well as management in the various agencies must be committed to the change; they must know what change is taking place and why it is important. If they do not understand the need for change, it is unlikely that any consolidation of services will occur. Positive presentation of the proposal by critical mass actors throughout the transition phase is essential in overcoming any adverse reaction.

**Responsibility charting** - This method is an effective technique for clarifying behavior needed to bring about the change function, actions and key decisions. Responsibility charting also assists in reducing ambiguity, focuses on specific tasks and reduces interpersonal reactions of those involved in the change process.

**Confrontation / goal setting meetings** - This technique provides a forum for gathering information on needed changes and recommending action on established priorities. The purpose of these meetings is to collaborate on the decision making processes in hopes of gaining cooperation and developing action plans for a common direction that will ultimately result in implementation of the desired change. The Commissioner/Deputy Commissioner should use this technique as an effective means to address concerns and/or special interests of those groups facing consolidation. By seeking input from representatives of these organizations, a sense of ownership can be instilled and a stronger commitment for change obtained.

**Problem finding** - is a neutral mechanism by which those concerned with change get together to identify and clarify all aspects of real or perceived problems. Politics and special interests will be paramount issues and the Commissioner can use problem finding as a means to reduce conflict or opposition to smooth the process. This mechanism also allows key players to change their minds without losing face in the process and fosters listening without having to take an immediate position that may reflect personal biases.

**Communications strategy** - Rumors and false perceptions cannot be allowed to threaten the process. In order to maintain a clear focus and eliminate rumors, it is paramount that the Commissioner establish and control where, when, and how communications will be made and by whom. Video presentations, press releases and other journal articles are effective means to accomplish this purpose. These methods are effective because it will be necessary to reach a wide variety of individuals and groups with accurate and consistent information. Face to face communication will also be an important aspect of the communications strategy; especially when that contact is critical in obtaining commitment and in overcoming fear and apprehension. Effectively using the above methods as tools should ensure the accomplishment of a smooth transition management plan that will enable the California Highway Patrol to achieve its desired future state.

### **TRANSITION MANAGEMENT**

The project director is one who must be committed to the proposal, promote the strategy, and be its focal point. Since this actor is a key player during the transition phase he/she must be the strategy's strongest advocate. Following is a transition management implementation outline that defines the methods and status of the proposed transition, timetables, and responsibility. The project director must be thoroughly familiar and supportive of this plan and be prepared to see it through to conclusion.

## TRANSITION MANAGEMENT IMPLEMENTATION OUTLINE

### Phase I

#### Plan and Organize

- A. Develop a comprehensive seven year plan for assumption of transportation related law enforcement services.
  - 1. Desired future environment described.
  - 2. Cost/benefit analysis justifying need for change.
    - a. Obtain input from impacted organizations.
  - 3. Proposed organizational structure.
    - a. Obtain input from impacted organizations.
  - 4. Develop goals and timetables.
- B. Commissioner presents strategic plan to Secretary of Business and Transportation Agency.
  - 1. Desired future environment described.
  - 2. Rationale, reason and need justifying the change.
  - 3. Strategy and design of the transition plan.
  - 4. Required resources.
  - 5. Personnel structure, accountability and reporting.
  - 6. Recommended timetable.
- C. Secretary of Business and Transportation Agency approves and endorses plan.
  - 1. Commits individually.
  - 2. Provides input.
  - 3. Accompanied by Commissioner, presents to Governor.
- D. Governor approves and endorses plan.
  - 1. Commits individually.
  - 2. Provides input.
  - 3. Commits resources.
  - 4. Presents to legislature.



- E. Legislature approves and endorses plan.
  - 1. Collectively commit to proposal.
  - 2. Provide input.
  
- F. Achieving commitment and understanding.
  - 1. One-on-one meetings with critical mass actors.
  - 2. Introductory meeting with all critical mass actors.
    - a. Team building setting.
    - b. Desired future state described.
    - c. Goals and objectives defined.
    - d. Methods of achievement defined.
    - e. Individual roles, responsibilities, and obligations agreed upon.
    - f. Pledge commitment - individually and collectively.
  
- G. Communications strategy.
  - 1. Internal announcements to impacted organizations regarding change implementation and perceived roles in transition.
    - a. Clear and concise with all the "whys" answered.
    - b. Clearly state that input is valued and appreciated.
  - 2. External announcements to public.
    - a. Purpose and intent of strategy.
    - b. Goals and objectives of consolidation.
    - c. Cost/Benefit analysis.
  - 3. Develop mechanism for feedback - internal and external.
  - 4. Structure publication, presentation and administration methods, and protocol.
  
- H. Analyze and prepare organizational structure.
  - 1. Evaluate existing organizational structures and formulate the new structures that will be required.
  - 2. Identify tasks.
  - 3. Define responsibilities and accountability.

4. Establish communication and decision making protocol.
- I. Establish interim management roles and processes.
  1. Individual organizational requirements and obligations.
  2. Transition teams and their roles.

## **Phase II**

### **Implement**

- A. Phases of change implementation.
  1. Implement new organizational structure.
  2. Allocate personnel to accomplish transition.
  3. Allocate resources.
  4. Provide necessary direction/training.
    - a. Mission statement
    - b. Purpose and objectives.
    - c. Policies and procedures.
    - d. Job descriptions.
- B. Complete necessary research.
  1. New systems required.
  2. New processes required.
  3. New modified or existing capabilities.
- C. Integrate new procedures with existing procedures.
  1. Personnel assignments and obligations.
  2. Resource allocation.
  3. Fiscal needs and encumbrances.

## **Phase III**

### **Formalize**

- A. Solidify newly created management structure.
  1. Systems integration accomplished.
  2. Document processing systems in place.
  3. Managerial structure in place and operational.

- B. Management interfacing and polishing operations.
- 1. Weaknesses identified and addressed.
  - 2. Conflicts minimized. Problems approaching resolution.

#### **Phase IV**

##### **Evaluate**

- A. Continuous evaluation and monitoring of transition.
  - 1. Objective conclusions.
  - 2. Flexible.
  - 3. Timely evaluation and response.
  - 4. Established schedule for formal evaluation by managerial representatives and critical mass actors.

#### **IMPLEMENTATION TABLE**

Consolidation of transportation related law enforcement services is a complex and controversial proposal. One that faces a number of obstacles that must be overcome to ensure its success. For these reasons, timing is critical in introducing change. Nevertheless, full transition should occur within the proposed seven year strategic planning cycle. Rapid transit is still considered to be in its infant stages and will pose fewer problems if consolidation can be accomplished before it expands further. For that reason the CHP should attempt to expand in this area as soon as possible. The suggested time frame allotment is as follows:

**Phase I - Plan and Organize.** This phase should begin immediately with scheduled completion no later than July, 1994. This will be an election year and consolidation of transportation related law enforcement services could be an important campaign issue for gubernatorial and legislative candidates. As such, the timing may be favorable in terms of reducing opposition to transition and minimizing the opportunity for potential power struggles. Should this window of opportunity be delayed it may postpone transition until the 1998 election.

It is incumbent on the project director to conduct pertinent research and present it for approval as soon as possible. A

comprehensive cost benefit analysis will be critical in attempts to justify consolidation. At minimum the presentation should include forecasted trends and events, threats and opportunities, potential adverse impact, and the positive aspects of the proposed strategy. It is extremely critical that strong emphasis be placed on the benefits to the public in realization of cost effectiveness, efficiency and consistency of transportation related law enforcement services.

**Phase II - Implementation** - There are a number of significant vested interests in consolidating transportation related law enforcement services. Direct involvement in the development and implementation of the proposed strategy acquires the inherent vested interest of the involved individual or group. Care must be exercised to generate sincere effort and objectivity during the development processes. Success during this critical stage will undoubtedly shorten the overall implementation time. Assuming that Phase I is successful, Phase II should begin immediately. It is anticipated that with the complexities of the organizations as well as the number of personnel involved, a one year time frame would be required. In no event shall completion of Phase II go beyond January 1, 1996.

**Phase III - Formalize** - It is during this phase that all of the efforts of planning are realized and the proposal becomes reality. During this stage flexibility is imperative in working out unperceived problems and in overcoming entrenched resistance to change. It will be impossible to consolidate all of the public agencies providing transportation law enforcement services simultaneously. Smaller agencies should be absorbed first using an incremental process. During the first year, Rapid transit districts in Orange, San Bernardino, Sacramento and San Diego counties should consolidate. San Francisco(BART), and Los Angeles (MTA) being the largest and most complex of the organizations, will consolidate in the second year. An incremental two year time line should be reasonable to accomplish full consolidation. Full implementation of the proposal will occur no later than January 1, 1998.

**Phase IV - Evaluation** - This phase should be on-going and used to monitor the successes of each phase. Based on the information obtained, adjustments can be made that will ensure timely and effective

implementation of the transition strategies. Proper evaluation will also be the ultimate measure of success in consolidating transportation related law enforcement services.

### PERCEIVED OBSTACLES

An important element in the change process is attempting to anticipate potential obstacles which may inhibit success. Successful identification and consideration of potential obstacles during the planning process may reduce their impact and adverse effect. Equal consideration must also be given to forecasted trends and events as well as the idiosyncrasies of the recommended strategy.

Unfortunately the complexity of consolidating transportation related law enforcement services is a major obstacle in itself. Politically, each step forward in this process is critical and can be met with strong opposition that may ultimately result in the failure of the proposal. Even though the proposal is sound, to step outside the bounds of the "chain of command" or protocol may be the catalyst that initiates failure. Vested interests of key individuals and organized special interest groups loom at every corner. It will be extremely difficult to cater to them and satisfy their demands.

It is imperative that the project director maintain enthusiasm and control in spite of any setbacks that may occur. Positive interaction with staff and critical mass actors will be paramount in implementing the chosen strategy. It is also important that the project director remain flexible and stand ready to compromise. If total consolidation of transportation related services cannot be achieved, perhaps some expansion of CHP responsibilities can be attained as new rapid transit systems come on line.

Inaccuracies in communicating the proposed strategies for consolidation of transportation related law enforcement services also pose a threat. It is anticipated that local government will view the proposal as a means to further impose State control over cities and counties. Additionally, local law enforcement will feel threatened and express opposition due to a perception that they will experience some

loss of responsibility and authority. Inaccuracies can also provoke insurmountable resistance to change within agencies targeted for consolidation. To overcome these obstacles a thorough check and balance system is critical and must be maintained in order to ensure timely and accurate dissemination of information. All of the data to support the proposal for change must be accurate as well as available to those who question the merits of consolidation. The credibility of the content and the methods used to compile the data must be unquestionable.

The appearance or induction of a different critical mass actor may present an obstacle. Although the opportunity for least opposition exists during election year, it also presents the greatest potential for introducing a new critical mass player. Should the Governor not be re-elected, there is a probability the Commissioner of the California Highway Patrol and the Secretary of the Business and Transportation Agency will change. Several members of the legislature may also change. It will be necessary to obtain support of any new individuals as soon as possible to avert delaying implementation of the proposed strategies. Each new actor must be briefed on the merits of the proposal and their specific role, responsibility and obligation. They must be placed in a position to commit their support and be continuously monitored and nurtured in the same manner as all other critical mass actors. As always, it must be part of the overall strategy to be watchful for any new or changing actors.

The identification and anticipation of obstacles must be a continuing process throughout each phase of this transition management plan. Successfully identifying and addressing potential obstacles will result in a timely transition to achieve the desired future state.

In an era of resource scarcity it is paramount that law enforcement be as cost effective and efficient as possible. As a result of dwindling resources it will be difficult to keep pace with the public's increased demand for services. The proposal for consolidation of transportation related law enforcement services is a proactive, futuristic approach, designed to make effective use of the law enforcement

personnel; while at the same time becoming a more efficient and cost effective operation. This transition plan also parallels government's strong desire to streamline agencies and provide a higher level of service to the public.

Travel as it is known today will be significantly different by the turn of the century. Rapid transit as well as new transportation technologies and strategies are rapidly being developed and implemented. Collectively they are designed to reduce the adverse effects of traffic congestion. Ultimately, as rapid transit and these new strategies and technologies become more prevalent, the need for traffic services on the State's transportation networks will decline. As a result, law enforcement agencies with traffic management responsibilities will be able to correspondingly reduce the number of personnel assigned solely to traffic law enforcement. Reassignment of these individuals will also serve to fill some of the void created by the lengthy recession. Agencies will now be able to better direct their efforts toward crime suppression. In contrast, the California Highway Patrol is task specific. The only alternatives available to the CHP are to expand its leadership role by assuming transportation related law enforcement responsibilities, reduce personnel, or face partial or total obsolescence. Expansion into other transportation related fields is but the first step in expanding the role of the CHP as a leading law enforcement agency. Strategy #2, consolidation of all state law enforcement services, goes one step further and creates a single cost effective and professional State law enforcement agency that will ultimately provide a higher level of service to the public. In expanding the role of the CHP into rapid transit law enforcement responsibilities (Strategy #3), administrators should remain cognizant of other opportunities to expand the CHP.

The suggested methods of transition and implementation for the CHP to assume transportation related law enforcement responsibilities are intended to maintain simplicity while accomplishing the desired future state for the California Highway Patrol in maintaining its leadership role as a leading law enforcement agency in the management and regulation of traffic. Furthermore, it accomplishes the goal of State

government to become more efficient and cost effective in managing its resources.

### Conclusions

What impact will emerging transportation technologies involving vehicles and highways have on traffic law enforcement by the year 2002? As previously stated, this is not a question easily answered. There is significant information available that documents what new emerging technologies are being developed, how they will work and the positive impact they will have on the movement of traffic. What isn't available is information and or documentation that forecasts the impact that new technologies will have on reducing congestion. Subsequently, the impact that these technologies will have on law enforcement is extremely subjective. In pursuit of this information, this researcher attempted to have experts within the field of both technology and transportation commit to some percentage of improvement should these new transportation systems become common place. For Example, JHK associates are well known for their work in Intelligent Vehicle Highway Systems and traffic operation centers in Chicago, New York and California. In a best case scenario they were asked to speculate that if 10 years from now their technology was fully operational and worked as designed, what percentage of a reduction in traffic congestion could be expected. JHK associates vehemently declined to even venture a guess indicating that there were a number of factors that would need to be studied before an accurate assessment could be made. Public entities (California Department of Transportation) also refused to speculate.

In the futures forecasting portion of this research the NGT panel indicated that implementation of technology would be slow at best due to a lack of funding and the public's unwillingness to give up the comfort and convenience of their personal car. Although the panel predicted there would be significant progress in the development of mass transit, the public will not seriously consider this mode of transportation as an alternative. A major increase in the price of gasoline and convenient, low cost, mass transportation are the only



factors predicted that would have an impact on the personal vehicle remaining the primary mode of transportation into the 21st century.

This forecast coincides with the research information presented in Vision 2010 that indicates traffic will get worse, not better. As a result there will be greater demands placed on law enforcement to manage and regulate traffic. This will necessitate that law enforcement plan for and seek out additional personnel to carry out mandated responsibilities. Nevertheless, law enforcement administrators agree that more and more police to do the job is not the answer. This is especially true as a result of a trend in declining funds that the NGT panel predicted will continue for at least the next ten years. Law enforcement administrators also agree that technology is the only means by which to keep pace with increasing demands for traffic services. Unfortunately, this scenario suggests that traffic law enforcement will remain status quo into the 21st century.

In contrast, private industry is continuing to spend billions of dollars in research and development for transportation technologies and mass transit that will redefine travel as it is known today. Some of this development is even subsidized by the federal government. The 1991 U.S. transportation act allocated \$660 million over six years for the development and implementation of Intelligent Vehicle Highway Systems. A company currently working on this technology, IVHS America, estimates that the creation and deployment of intelligent vehicles and highway systems in the United States will require nearly \$200 billion over 20 years.<sup>11</sup> In Europe, the Prometheus IVHS project has the underwriting of virtually the entire European auto industry. Also, industry and government partnerships are conducting traffic automation tests in Japan. The implementation of these technologies depends on whether society decides to spend the resources to develop and deploy these systems.

In taking a contrasting viewpoint from the NGT's forecasts, this researcher, after consultation with POST, opted to continue the study taking a position that new transportation technologies would exist, that they would be implemented on a wide scale, and they would work as designed. As a result, the requirement for law enforcement to provide

traffic management responsibilities would be significantly impacted. Law enforcement agencies are well versed in maintaining the status quo. A look into the future as to "*what might be*" entails considerable foresight and flexibility. Should these technologies be implemented they will have an impact on every law enforcement agency, large or small, who have traffic management responsibilities. However, the potential impact will be greater on the larger agencies due to the number of personnel and resources assigned. The California Highway Patrol being a task specific organization, in terms of the management and regulation of traffic, may be presented with significant reductions of personnel and loss of responsibility. The organization could conceivably face partial or total obsolescence if they fail to attain their goal to maintain a leadership role in the management and regulation of transportation related activities.

Subjectively let one assume that there is a 20% reduction in traffic congestion as a result of mass transit and new transportation technologies being implemented. For the Los Angeles Police Department this would provide an opportunity to take 140 of the 702 officers currently assigned traffic management responsibilities and reassign them to other priorities. LAPD would also be able to redirect more than \$85,000 to other programs. In comparison, the CHP could lose more than 1,000 officers and \$120 million dollars of their budget. If the reduction is greater than 20%, and there is significant potential that it could be, the CHP would lose even more personnel and resources. Unless the CHP expands its responsibility the leadership role of the organization will be negatively impacted. The most logical expansion of the organization's responsibilities at this time is in the field of rapid transit. The strategic plan and the implementation plan explore these alternatives and recommend a course of action. Both are slanted towards the CHP as an organization because of this researcher's affiliation with this organization. The material presented in the plan can be used by the smallest agencies to plan for future traffic management responsibilities as new transportation technologies emerge. The state perspective can be transposed to coincide with a municipal or county government structure.

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## EVENTS

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- B AUTO VEHICLE LOCATORS FOR VEHICLE THEFT AND OTHER CRIMES
- C MAGNETIC-LEVITATION TRAINS DEFINE LONG DISTANCE TRAVEL
- D ALTERNATE FUEL SOURCES AVAILABLE TO URBAN AREAS
- E RECOVERING ECONOMY CAUSES INCREASED CONGESTION
- F ADAPTIVE CRUISE CONTROL - RADAR TECHNOLOGY
- G DECENTRALIZED URBAN GROWTH POLICY
- H DEVELOPMENT OF ADVANCED MACHINE VISION TECHNOLOGY
- I SINGLE CENTRALIZED LAW ENFORCEMENT AGENCY
- J REDIRECTION OF DEFENSE TECHNOLOGY TOWARDS TRAFFIC AND VIOLENT CRIMES
- K REGIONAL TRAFFIC MANAGEMENT AGENCY
- L CONGESTION LEVELS WILL CAUSE CONGESTION PRICING
- M WAR WILL CAUSE REDIRECTION OF TRANSPORTATION TECHNOLOGY PROGRESS
- N FREE TRADE ENHANCES/INCREASES COMMERCIAL CONGESTION
- O NATURAL/NUCLEAR DISASTER AFFECTS 1/3 OF STATE
- P COMPLETION OF DIGITAL CELLULAR TECHNOLOGY - I.E. PERSONAL COMMUNICATION DEVICES - PCD'S
- Q INCREASED USE OF HOV FACILITIES
- R INTER-ACTIVE TV AND VIDEO AND EFFECTS ON PUBLIC PERCEPTION
- S AQMD MANDATES MINIMUM PASS-PER-VEHICLE RATIO DURING COMMUTE HOURS
- T INVASION OF PRIVACY ISSUE/ PUBLIC'S PERCEPTION
- U AQMD REQUIRES EMPLOYERS TO SUBSIDIZE TRAVEL THRU MONEY/INCENTIVES
- V LEGISLATED VEHICLE PERFORMANCE AND DESIGN
- W TRAFFIC MANAGEMENT SYSTEMS REQUIRE GREATER LAW ENFORCEMENT RESPONSE
- X REDUCED INDUSTRIALIZATION
- Y TRAFFIC MANAGEMENT BECOMES AN ENVIRONMENTAL ISSUE
- Z PUBLIC BACKLASH - AQMD ABOLISHED
- A1 CATASTROPHIC COLLAPSE OF INFORMATION INFRASTRUCTURE
- A2 FAILURE OF INFRASTRUCTURE REQUIRES INCREASED LAW ENFORCEMENT RESPONSE
- A3 FUNDING UNAVAILABLE TO IMPLEMENT TECHNOLOGY

## APPENDIX A

## EVENTS

- A LONG TERM OIL EMBARGO - SHOCK TO ECONOMY TRIGGERS ALTERNATE FORMS OF MASS TRANSIT
- B AUTO VEHICLE LOCATORS FOR VEHICLE THEFT AND OTHER CRIMES
- C MAGNETIC-LEVITATION TRAINS DEFINE LONG DISTANCE TRAVEL
- D ALTERNATE FUEL SOURCES AVAILABLE TO URBAN AREAS
- E RECOVERING ECONOMY CAUSES INCREASED CONGESTION
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- G DECENTRALIZED URBAN GROWTH POLICY
- H DEVELOPMENT OF ADVANCED MACHINE VISION TECHNOLOGY
- I SINGLE CENTRALIZED LAW ENFORCEMENT AGENCY
- J REDIRECTION OF DEFENSE TECHNOLOGY TOWARDS TRAFFIC AND VIOLENT CRIMES
- K REGIONAL TRAFFIC MANAGEMENT AGENCY
- L CONGESTION LEVELS WILL CAUSE CONGESTION PRICING
- M WAR WILL CAUSE REDIRECTION OF TRANSPORTATION TECHNOLOGY PROGRESS
- N FREE TRADE ENHANCES/INCREASES COMMERCIAL CONGESTION
- O NATURAL/NUCLEAR DISASTER AFFECTS 1/3 OF STATE
- P COMPLETION OF DIGITAL CELLULAR TECHNOLOGY - I.E. PERSONAL COMMUNICATION DEVICES - PCD'S
- Q INCREASED USE OF HOV FACILITIES
- R INTER-ACTIVE TV AND VIDEO AND EFFECTS ON PUBLIC PERCEPTION
- S AQMD MANDATES MINIMUM PASS-PER-VEHICLE RATIO DURING COMMUTE HOURS
- T INVASION OF PRIVACY ISSUE/ PUBLIC'S PERCEPTION
- U AQMD REQUIRES EMPLOYERS TO SUBSIDIZE TRAVEL THRU MONEY/INCENTIVES
- V LEGISLATED VEHICLE PERFORMANCE AND DESIGN
- W TRAFFIC MANAGEMENT SYSTEMS REQUIRE GREATER LAW ENFORCEMENT RESPONSE
- X REDUCED INDUSTRIALIZATION
- Y TRAFFIC MANAGEMENT BECOMES AN ENVIRONMENTAL ISSUE
- Z PUBLIC BACKLASH - AQMD ABOLISHED
- A1 CATASTROPHIC COLLAPSE OF INFORMATION INFRASTRUCTURE
- A2 FAILURE OF INFRASTRUCTURE REQUIRES INCREASED LAW ENFORCEMENT RESPONSE
- A3 FUNDING UNAVAILABLE TO IMPLEMENT TECHNOLOGY

## APPENDIX A

## EVENT FORECAST (Nominal Data)

EVENT	Years until probability first exceeds zero	Probability (0-100)		Impact on the issue if the event occurred (0-10)	
		+5 years 1997	+10 years 2002	Positive	Negative
1. Statewide traffic management agency created.					
2. Transportation technologies require greater law enforcement response.					
3. Funding is unavailable to implement technology.					
4. Gridlock as a result of a recovering economy.					
5. Traffic management becomes an environmental issue leading to court mandate for law enforcement action.					
6. Catastrophic collapse of roadway network requires law enforcement response.					
7. Completion of digital cellular technologies (PCD's).					
8. AQMD mandates minimum 4 passenger per vehicle ratio during commute hours.					
9. Failure of information infrastructure.					
10. Magnetic Levitation train redefines long distance travel in the United States .					

N=

## TRENDS

- A INCREASED FUNDING
- B VIDEO/ELECTRONIC LAW ENFORCEMENT
- C PERSONAL VEHICLE REMAINS
- D PRIMARY MODE OF TRANSPORTATION
- E DEMAND FOR TRAFFIC INFORMATION AND ITS IMPACT ON THE PUBLIC
- F DIMINISHING RESOURCES
- G REDUCED COST OF TECH. ENHANCING SOPHISTICATION OF VEHICLES AND HWYS
- H EXODUS OF SKILLED LABOR REPLACED BY UNSKILLED LABOR
- I STRATIFIED SOCIETY (HAVES VS. HAVE NOTS IN TERMS OF TECHNOLOGY)
- J CHANGING ROLE OF LAW ENFORCEMENT
- K CONFLICTING ROLES OF LAW ENFORCEMENT AGENCIES
- L INCREASED USE OF MASS TRANSIT FOR COMMUTING
- M INCREASE IN TRAFFIC RELATED VIOLENCE
- N ENHANCED SAFETY OF ROADWAYS AND VEHICLES
- O POLITICAL ACTIVISTS BLOCKING FREEWAYS AND HIGHWAYS
- P INCREASED CULTURAL DIVERSITY WILL SLOW/IMPEDE TRAFFIC MANAGEMENT
- Q ENGLISH AS 2ND LANGUAGE IMPACTING INFO FLOW
- R IMPACT OF ADA ON MANAGEMENT AND REGULATION OF TRAFFIC OR DRIVERS
- S EFFICIENT USE OF GOVERNMENT RESOURCES
- T LIBERALIZATION OF POLITICAL CLIMATE (SOCIAL VS. ECONOMIC GOALS)
- U ALTERNATIVE WORK SCHEDULES - TELECOMMUTING
- V SHRINKING LAW ENFORCEMENT WORKFORCE
- W NEED TO IDENTIFY ALTERNATE FUNDING RESOURCES
- X AUTOMATION
- Y PUBLIC SUPPORT FOR INTRUSIVE INFORMATION SYSTEMS
- Z RELUCTANCE OF PUBLIC TO TRAVEL IN PERCEIVED UNDESIRABLE AREAS
- A1 SPECIAL INTEREST GROUPS/POLITICS AFFECTING IMPLEMENTATION OF TECHNOLOGY
- A2 CHANGING ATTITUDES AND ABILITIES OF DRIVERS
- A3 RESISTANCE TO LOSS OF PERSONAL FREEDOM

## APPENDIX C

## TREND EVALUATION (Nominal Data)

TREND STATEMENT	Level of the Trend (today = 100)			
	* 5 Years ago	* Today	* 5 Years Nominal "Will Be"	*10 Years Nominal "Will Be"
1. Fiscal environment.				
2. Alternate modes of transportation.				
3. Demand for traffic information.				
4. Amount of use of mass transit for commuting.				
5. Efficient use of government resources funds transportation technologies.				
6. Privatization of transportation management.				
7. Level of traffic related violence.				
8. Influence of special interest groups/politics implementing transportation technologies.				
9. Level of alternate funding sources.				
10. Amount of change in attitudes and abilities of drivers.				



## **END NOTES**

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